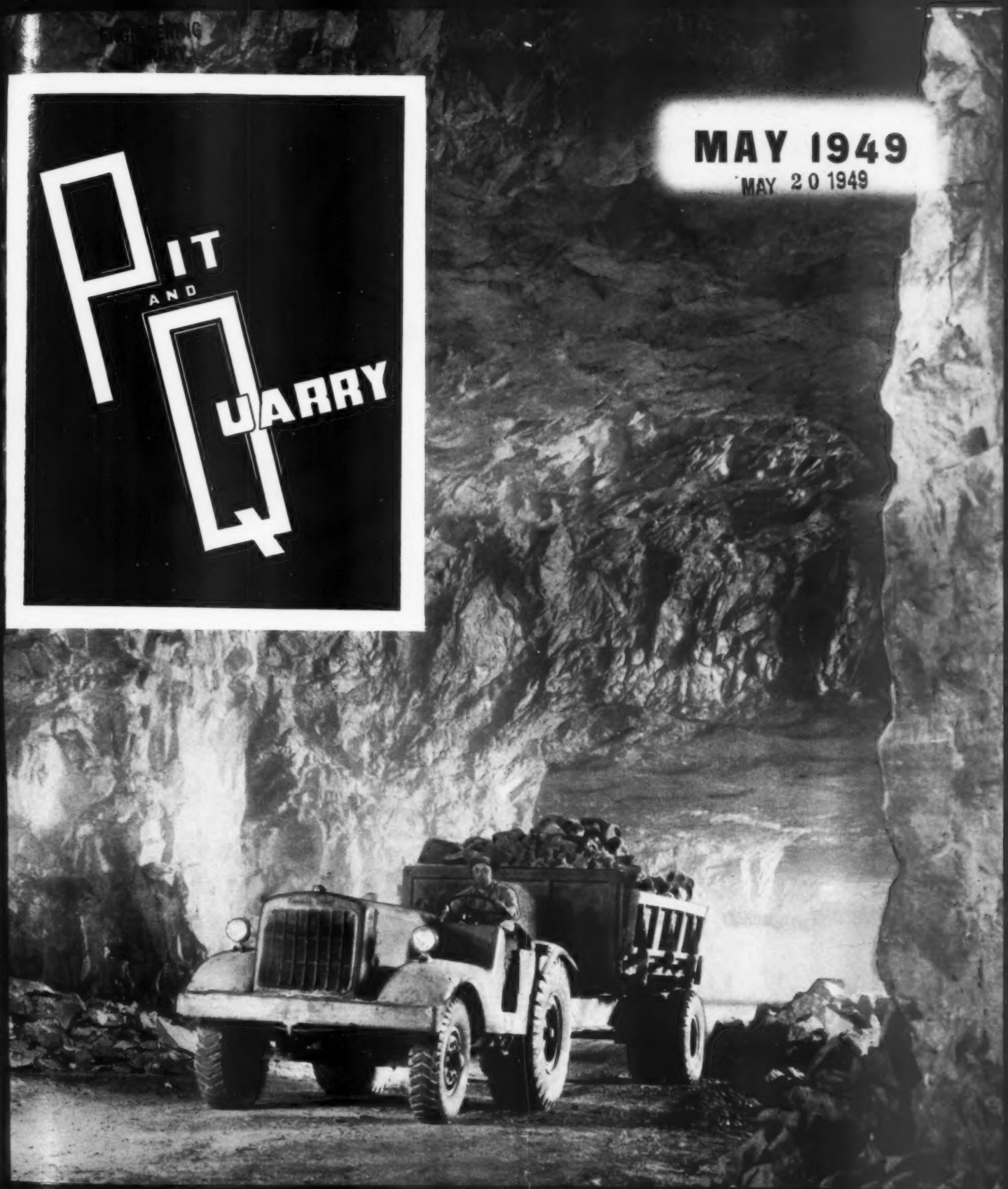
ENGINEERING

PIT AND QUARRY

MAY 1949

MAY 20 1949



Above photos show New Holland Double Impeller Breaker installation at Hudson Stone Products Company; also . . . actual size material as it comes from delivery conveyor before screening. Notice uniformity of shapes and sizes. This is the result of "Dual Impact" action! Breaking force evenly distributed assures accurate sizing without irregular shapes—even with slabby material!

In limestone . . .

"Crush more material to desired size with less power"

says
TOM HUDSON, owner,
Hudson Stone Products Company,
Lynchburg, Ohio

● Early in 1947, Tom Hudson modernized his plant. He replaced three units with a single New Holland Model 3030 Double Impeller Breaker.

From the layout of his plant which is indicated above, you can easily see what Mr. Hudson means when he says . . .

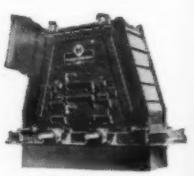
"A one-crusher plant can be successfully built around this crusher (the New Holland Double Impeller Breaker) . . . which permits a minimum of other equipment . . . contributes materially toward low maintenance."

In pits and quarries all over the world, "Dual Impact" action is producing outstanding results.

The record is the same . . . higher production at lower cost . . . in limestone, basalt, granite, gravel, and many other types of stone.

New Holland Double Impeller Breakers are available in four sizes—1212, 2020, 3030, 5050—to meet your requirements. They can be adapted easily to either an open or a closed circuit.

Whatever your crushing problems—bring them to New Holland engineers. They will help you as they have helped so many other operators. Write Department **P-59** today.



NEW HOLLAND DOUBLE IMPELLER BREAKERS

NEW HOLLAND MANUFACTURING COMPANY, MOUNTVILLE, PA.

NAME IT...

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Dolomite
Feldspar
Fullers' Earth
Industrial Clays
Kaolin
Lightweight Aggregates
Lime Putty
Magnesite
Mica
Phosphate
Portland Cement
Shale
Pumice
Refractories
Sand-Lime Brick
Shale
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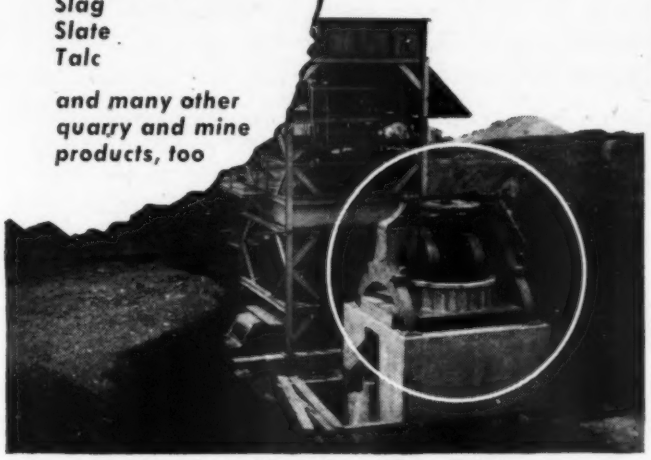
and many other quarry and mine products, too

. . . and you can have it

American

GROUND



"American" No. 9 Heavy Duty Grinder

What material do you grind? Chances are that one of the 8 sizes of "American" Grinders can deliver the VOLUME you need . . . in the SIZE you require . . . at a LOWER COST that will impress you.

If your product is of the type suggested by the list above . . . let an "American" grinding specialist help you lick your problems once and for all. Write, wire, phone.

To suggest rate of output . . . "American" Grinders produce minus ⅜" aggregate ground CINDER and clinker volume at these rates:

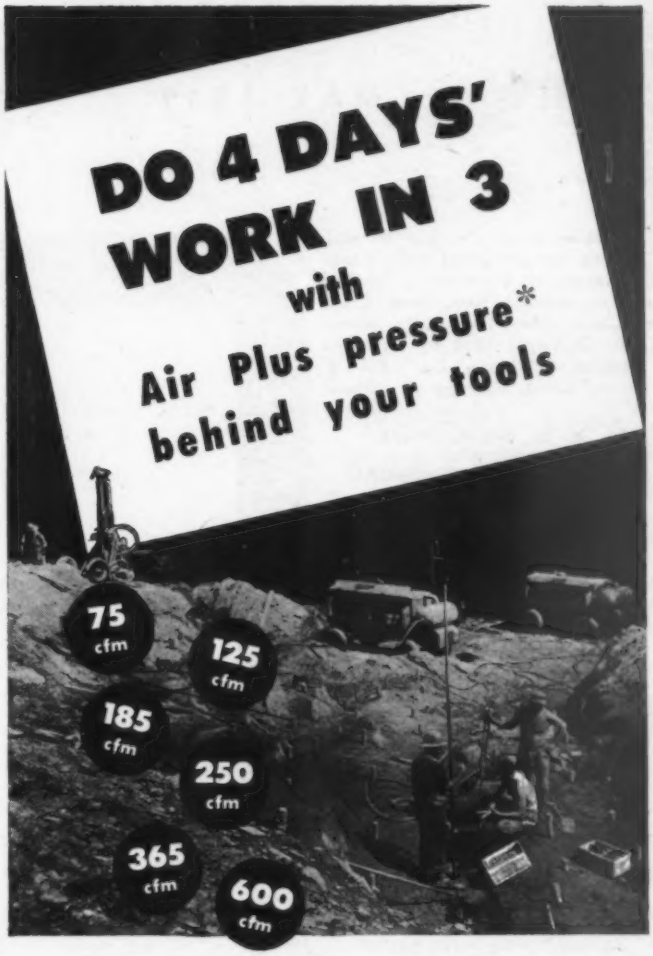
Grinder No.	5	6	7	8	9	482	418	384
Yds. per Hour	4	6	12	20	30	35	50	75

American *by*
THE W. A. RIDDELL CORP.
BUCYRUS, OHIO

DO 4 DAYS' WORK IN 3

with

Air Plus pressure* behind your tools



New Jaeger compressor ratings mean steady 90 lbs. pressure *at which tools do 30% to 40% faster work*

Drills and breakers, that loaf under weak 70 lbs. pressure from undersized compressors, get up and go to work with Jaeger air power on the job. Jaeger's "new standard" ratings provide the air you need to keep tools working at top pressure, increase their speed an average of 200 blows per minute and put full impact into every blow. *Users will tell you they can do as much work in 3 days as they used to do in 4, with the same men and tools.*

From the Model 75, that runs a heavy breaker at full 90 lbs. pressure, up to the Model 600 that runs two big wagon drills at top efficiency, every "Air Plus" rating is designed to match today's tools. See your Jaeger distributor, or send for Catalog JC-8.

*"Air Plus pressure" means steady 90 lbs. at the tool; requires more air than old 60 to 500 cfm ratings established in 1932.

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CONCRETE and BITUMINOUS PAVING MACHINES

Vol. 41 MAY 1949 No. 11

PIT AND QUARRY

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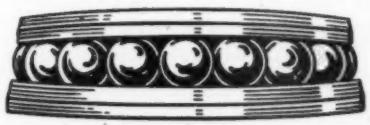
On the Ball

KILN FIRING AT KIMBALLTON

with B&W Pulverizers



One of America's largest lime plants is that of National Gypsum Co. at Kimballton, Va. It is a fine example of sound engineering and design.

Two 300-ft kilns are direct-fired by B&W Type E Pulverizers—which employ the efficient ball-bearing method of grinding.

B&W's 24-year experience in the design, construction and installation of direct-firing pulverizers is at the service of cement and lime-kiln operators all over the country. Call in the nearest B&W representative for an analysis of your requirements when planning modernization of existing facilities or a new plant program.

One of two B&W Type E-35 Direct-Firing Mills at Kimballton, and (above) hood of one of National Gypsum's two 8' and 10' x 300' rotary kilns.

BABCOCK & WILCOX

THE BABCOCK & WILCOX COMPANY, 85 Liberty Street, New York 6, N. Y.

C-84

editorial

Profitable Cooperation

THE American Management Assn., a non-profit organization of industrial and commercial companies and executives interested in modern and efficient management methods for their own companies, has just released the results of a two-year study of the possibility of obtaining "Greater Productivity Through Labor-Management Cooperation." Information obtained through questionnaires, and plant field surveys which included hundreds of interviews with production and personnel men, union officials, and individual employees, shows that the movement in that direction is spreading, even if slowly. There seems to be a good possibility that the movement toward formal cooperation will grow sufficiently to exert a major influence on industrial relations. Every employer should study the applicability of such methods to his business.

It is explained in this report that cooperation of the type covered in the A.M.A. survey is based on the idea that it is to the common advantage of management and labor (both organized and unorganized) to raise productivity—that only with increased output can both wages and profits be increased without the necessity of resorting to price increases. Those in favor of cooperation hold that much of the existing disagreement over such matters as safety rules, output standards, quality control, etc., is fundamentally unnecessary because no real conflict of interest exists, and that the individual employee will take a real interest in output and efficiency only if he is given a sense of participation in the enterprise.

THE report is confined only to formal plans of cooperation but recognizes that a great deal of informal cooperation exists in many companies, especially between management and individual employees. Participation, in the cases studied, is through groups of management and employee members which meet regularly to discuss common problems. The degree of participation varies widely with different companies but can be broken down roughly into three groups. (1) It may be purely informational, with management and labor gathering facts on common problems. (2) It may be advisory, with both management and labor having the opportunity to ask each other for advice. (3) It may be constructive, with either party having the right to initiate proposals.

Of the 228 companies which answered the questionnaire sent out, two-thirds expressed themselves as "pleased," in varying degrees, with the results of cooperation. Only seven were "keenly" and four "moderately" disappointed. Most companies felt that the limit of their cooperative efforts had not been reached. These included 50 companies with CIO unions, 35 with AFL unions, 19 with independent unions and 11 non-unionized companies. About three-fourths of these companies reported that their unions had given them considerable aid—only six (all with CIO unions) declaring further attempts at cooperation to be useless.

Union opinion, obtained at the top level, was that where cooperative effort existed, it helped to shift relationships with management from open warfare to peaceful disagreement. The preponderance of employee opinion was favorable to cooperative experience.

AMONG the principal findings of the A.M.A. report are the following:

1. Labor-management cooperation seems to be much more prevalent than it was a decade ago. Of the 228 companies which reported that they had engaged in some type of labor cooperation at some time during the past five years 201 are still actively doing so.

2. Cooperation's capacity to survive is considerable. The survey showed that more than one-third of the current labor-management committees have existed from two to five years, 20 percent from five to ten years, and 20 percent over ten years. It also showed that the critical period was between the second and fifth years, when two-thirds of all failures occurred. Few failures took place after cooperation had survived for over five years.

3. Where cooperation has been successful in unionized companies, it appears to have narrowed the field of disagreement between management and union. It has, for example, lessened the pressure on unions to fight disciplinary action for infraction of safety rules, and has lessened friction over standards of output.

4. Many companies, both unionized and non-unionized, claim that cooperation has led to improved employee attitude.

5. Formal cooperation is most heavily concentrated in medium-sized firms; more than half of those reporting had from 500 to 5,000 employees. It was suggested that many smaller firms find it easier to use more informal methods of cooperation, while the very large companies hire staffs of industrial relations experts.

6. Cooperation appears to have a greater chance of success when started during periods of prosperity, but some instances were reported in which rather far-reaching cooperation plans helped to save companies from disaster during periods of depression.

Some companies have achieved rather spectacular results in various directions through such cooperation. The Workmen's Safety Committee of the Colonial Beacon Oil Refinery helped reduce the number of injuries by more than 90 percent over 18 years. Joint waste reduction campaigns at the Westinghouse Electric Corp. led to a halving of defective work losses within a year or two. At the Wolverine Tube Division of the Calumet and Hecla Copper Co. production in pounds per man-hour increased about 60 percent within a year after cooperation was introduced, and earnings went up more than 20 cents an hour.

The results of this A.M.A. survey serve as further proof that employer-employee cooperation can be successfully and profitably applied to any company, industry or type of industry. It can no longer be said that such practices can be applied only in exceptional companies or industries, or that special genius is required to bring about such cooperation. An open-minded attitude toward labor and a sincere determination to make cooperation work are the primary requisites.

Walter E. Trauffer

news of the industry

A. M. Andreas, J. J. Porter Named to Top Posts by N. American Cement Corp.

According to an announcement released by the board of directors of the North American Cement Corporation, New York, N. Y., the following have been named to important posts:

John J. Porter, honorary chairman of the board; Albert M. Andreas, chairman of the board; Perry W. Andreas, assistant to the chairman; Thomas J. Harte, president; Edwin S. Guth, vice-president in charge of operations; Roy S. Adkins, vice-president in charge of sales; Alexander M. Tyree, secretary; Edgar K. Miller, treasurer and assistant secretary; Francis B. Cummings, controller and assistant treasurer; Walter E. Laut, assistant controller; and Russell E. Van Noy, assistant secretary.

Mr. Miller succeeds Charles R. Parks, who has retired after 48 years of service with this corporation and the predecessor company.

Mathieson Chemical Acquires Two Louisiana Concerns

Thomas S. Nichols, president of the Mathieson Chemical Corporation, Saltville, La., has announced that his firm will take over operations of Standard Wholesale Phosphate & Acid Works, Ind., and Southern Acid & Sulphur Co., Inc.

The names of both acquired companies will be discontinued immediately and all activities will be conducted in the name of the Mathieson Chemical Corporation.

Lehigh Valley Cement Firms Sign Wage Hike Agreement

The following Lehigh Valley Cement concerns recently granted wage increases of seven to nine cents per hour in an agreement reached on April 1: Universal Atlas Cement Company, Northampton, Pa.; Lone Star Cement Corporation and Nazareth Cement Company, Nazareth, Pa.; Hercules Cement Corporation, Stockertown, Pa.: and Lehigh Portland Cement Company's plants at Ormrod and Sandt's Eddy, Pa.

The settlement was based on a 6½ percent wage increase and renewal of other terms of the old contract with the International Cement, Lime & Gypsum Workers Union, which expired on March 31. Contracts for other Lehigh Valley cement mills are expected to follow the same pattern.

Harry E. Frech Succeeded In P.C.A. Post by C. J. Chappell

The retirement of Harry E. Frech, district engineer in the St. Louis office, has been announced by Carl D. Franks, vice-president of the Portland Cement Association. Mr. Frech, who served the association for 30 years, will be succeeded by Carl J. Chappell.

Mr. Frech joined the association in 1919 as a field engineer in Missouri. One year later he was appointed district engineer of the St. Louis district office, where he served continuously—except the time spent in the service of the U. S. Army—until his retirement.

Mr. Chappell, a civil engineering graduate of Kansas State College, joined the association general office staff in March, 1940, as a soil-cement engineer. In 1945 he was assigned to the St. Louis district as field engineer for Missouri.

Coming Events

May 5-7, 1949—Hot Springs. Annual convention, National Lime Association, The Homestead.

May 11-13, 1949—Hot Springs. Annual meeting, National Industrial Sand Association, The Homestead.

June 14-15, 1949—Kansas City. Directors' meeting (June 14) and program (June 15), National Agricultural Limestone Association, Inc., Hotel President.

June 27-July 1, 1949—Atlantic City. Fifty-second annual meeting, American Society for Testing Materials, Hotel Chalfonte-Haddon Hall.

Biggest Dry-Process Kiln Will Do Work of Seven at Lawrence Portland Plant

The Lawrence Portland Cement Company has placed orders for the engineering work and the purchase of accessories for a new dry-process kiln at its Northampton, Pa., mill. This new kiln will measure 10 ft. 6 in. in diameter by 400 ft. in length, making it the largest dry-process kiln known to be in operation. It is 86 ft. longer and 18 in. greater in diameter than the two kilns installed two years ago, which were then the largest.

The new kiln, officially known as "Number Sixteen," will replace seven small kilns which have been in operation for many years and will now be dismantled. The production of clinker by this new giant will approximate the total of the seven small kilns it will replace, and with a considerable saving in fuel consumption and costs. According to officials of Lawrence, this equipment will be in operation during the summer of 1950.

3M Invites Townspeople to Visit Wausau Granules Plant

More than 900 residents of Wausau, Wis., were treated to an inside view of operations at the roofing granules plant of the Minnesota Mining Manufacturing Company when the firm held open house for the first time since the opening of the Wausau facilities in 1933.

During a normal operating day 2,500 tons of rock from the company's quarry at Maine, Wis., pour into the big crushers and come out in one of the 44 colors featured by 3M. Between 25 and 30 carloads of granules are shipped out daily.

The visitors witnessed every stage of the process and were told how the company had streamlined its facilities to make possible continuous and almost dust-free operation.

Construction is under way on a new sand and gravel plant at North Corry, Pa., by the firm of A. Zalzneck and Son. When completed, the new facilities will also include the ready-mix cement plant operated by the Zalzneck brothers, Philip and Milton, for the past several months in Corry.

National Safety Council Announces Recipients Of Public Interest Awards

The National Safety Council on April 15 announced the recipients of its Public Interest Awards for exceptional service in accident prevention during 1948.

Thirty-six newspapers, 48 radio stations, one radio network, eight general circulation magazines, eight trade journals, five advertisers, and one film sponsor were honored by the board of judges for their exceptional leadership and support of the national safety movement last year.

The council emphasized that the awards, which will be made annually, were not competitive. They were made in recognition of outstanding support efforts of a continuing or exceptional nature by all public information media. PIT AND QUARRY was the only trade journal reaching the nonmetallic minerals industries so honored.

"The public information activities reviewed by the judges reveal a tremendous voluntary contribution to the cause of safety," said Ned H. Dearborn, president of the council. "Without this support and, in many cases, active leadership, the voice of safety would have been only a whisper."

Mines Bureau Investigates Liquid-Oxygen Explosives

Most accidents caused by liquid-oxygen explosives—used chiefly in open-pit mining in the United States—are blamed on the failure to provide and abide by safety regulations for handling this type of explosive, according to a new bulletin released today by the U. S. Bureau of Mines for sale through the superintendent of documents, U. S. Government Printing Office.

Commonly identified as "LOX," these explosives are prepared by soaking carbonaceous absorbents such as lampblack and carbon black in liquid oxygen of better than 99.5 percent purity. Detonation is effected generally by electric blasting caps. The bulletin describes the results of a cooperative survey made by the Bureau of Mines and the Linde Air Products Company, New York, N. Y., designed to establish test methods and investigate performance characteristics of liquid-oxygen explosives.

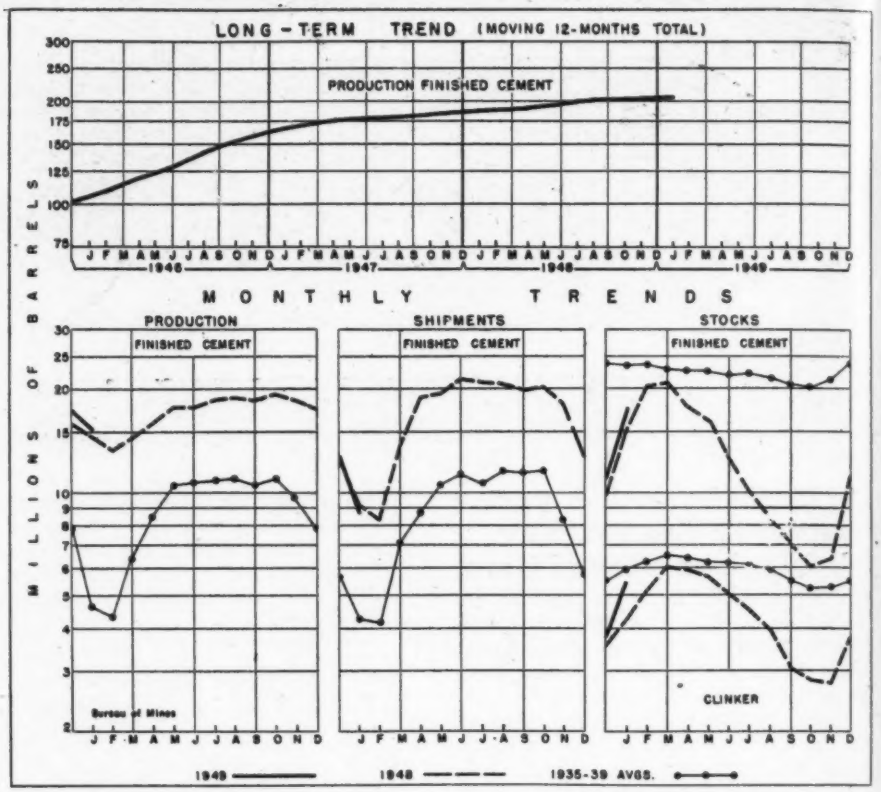
Fire danger is the main hazard associated with the use of LOX, as compared to fixed explosives, the Bureau report discloses. This arises from both the high inflammability of the explosive and from the presence of free oxygen which accelerates the combustion of any burning material and the ignitibility of combustible gases.

Of five liquid-oxygen explosives tested at the Bureau's Explosives Testing Station at Bruceton, Pa., the sensitivity to detonation by direct mechanical impact was somewhat higher than that of some fixed explosives, but the sensitivity to frictional impact was considerably lower, the cooperative research showed.

In addition to mechanical and frictional impact sensitivity, liquid-oxygen explosives were tested for burning behavior, detonator initiation sensitivity, sensitivity to electrostatic charges, fire resistance of wrappers, ignitibility of absorbents dispersed as dust clouds, strength, and rate of detonation.

Results of the survey and test procedures, which are expected to provide a guide to the manufacturers and users of LOX, were compiled by W. E. Tournay and F. M. Bower, cooperative investigators, and F. W. Brown, former physicist, Explosives Branch, Bruceton, Pa.

Copies of the report, Bulletin 472, *Safety and Performance Characteristics of Liquid-Oxygen Explosives,* may be obtained *only* from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., for 30 cents each. This bulletin is *not* sold by the Bureau of Mines.



SUMMARY—The portland cement industry produced 15,261,000 barrels of finished cement in January, 1949, as reported to the U. S. Bureau of Mines. This figure represents an increase of 5 percent over the production reported for January, 1948. Mill shipments totaled 8,756,000 barrels, a decrease of 5 percent as compared with the January, 1948, figure, while stocks of 17,589,000 barrels on January 31 were 15 percent above the January, 1948, totals. Clinker output in January, 1949, amounted to 17,011,000 barrels, representing an increase of 10 percent over the corresponding month of the previous year.

PRODUCTION—The output of 15,261,000 barrels of finished cement in January, 1949, came from 146 plants located in 35 states and Puerto Rico. In the same month of 1948, 14,541,000 barrels were produced in 146 plants. Clinker production increased 10 percent over the January, 1948, figure.

SHIPMENTS—Mill shipments of 8,756,000 barrels amounted to 5 percent less than those reported for January, 1948. The demand for cement in January, 1949, as indicated by mill shipments, decreased from that of the previous month (December, 1948)—12,741,000 barrels. Shipments were higher in 11 districts and lower in 8, than those reported in January, 1948. The changes range from a decrease of 63 percent in the Oregon and Washington district to an increase of 30 percent in the Virginia, Georgia, Florida, Louisiana, and South Carolina district. An increase of 2 percent is also indicated for the Puerto Rican district for January, 1949.

Portland cement is so finely ground that 90 percent or more will pass through a sieve with 40,000 openings to the square inch—a sieve so fine it will hold water.—*The Lawrence Dragon*

Federal Aid Expedites Big Hospital Construction Plan

With over $400,000,000 in total construction costs approved under the Hospital Survey and Construction Act since its passage in 1946, the United States is embarked on the most comprehensive hospital construction program attempted by any nation. This statement was made recently at the 30th annual convention of the Associated General Contractors of America at the Waldorf-Astoria Hotel by George L. Read, chief construction engineer, Division of Hospital Facilities, U. S. Public Health Service.

About 20 percent of the projects approved are already under contract, and a few are completed, he announced. Purpose of the program is to assist states in providing hospitals and health centers. It requires state surveys of actual need, stressing long-range planning and comprehensive state development plans, stated Mr. Read. It also authorizes federal aid and provides for state administration of the program within the state.

Bartel Succeeded by Bloem As Aide to Associations' Director of Engineering

Fred F. Bartel has resigned as assistant director of engineering of the National Sand and Gravel Association and as assistant to the director of engineering of

Fred F. Bartel

the National Ready Mixed Concrete Association to accept the position of engineer for the Tews Lime and Cement Company of Milwaukee, Wis. That company is a prominent member of the National Ready Mixed Concrete Association and Walter Tews is a member of its board of directors.

Mr. Bartel first became active in association work when he was appointed to the research fellowship at the University of Maryland sponsored by the National Sand and Gravel Association Research Foundation. He has been with the two associations since that time except for the interruption of World War II, during which he served as an officer in the ground forces of the Army Air Corps. He holds the degree of bachelor of science in civil engineering from the University of Wisconsin and of master of science from the University of Maryland. During his service with the association he has been active in commttee work of the American Society for Testing Materials, the American Concrete Institute and the Highway Research Board. He was assistant secretary of A.S.T.M. Committee C-9 on Concrete and Concrete Aggregates.

Mr. Bartel is being succeeded by Delmar L. Bloem who, until his promotion, was associate research engineer. Mr. Bloem joined the associations' staffs in 1945 and has been actively in charge of research activities at the University of Maryland for both organizations. He is a graduate of the Iowa State College with the degree of bachelor of science in civil engineering. He is the author of several papers dealing with concrete and concrete aggregates which have been published by the associations, the American Concrete Institute and the American Society for Testing Materials.

E. J. Zeigler will succeed Mr. Bloem as associate research engineer in direct charge of laboratory activities at the university. Mr. Zeigler is a graduate of the University of Maryland with the degree of bachelor of science in civil engineering. He served as a part-time student-assistant in the association's laboratory while attending school and joined the full-time staff as assistant research engineer in 1946.

Delmar L. Bloem

The manufacture of portland cement involves such diverse equipment as a 350-ft., 600-ton kiln, and scales sensitive enough to weigh the dust on a butterfly's wing.—*The Lawrence Dragon*

E. J. Zeigler

Frank W. Renwick, Pioneer Sand and Gravel Operator, Succumbs at Age of 82

Frank W. Renwick, president and general manager of the Chicago Gravel Company and its subsidiary, the Illinois Sand and Gravel Company, died on April 10 in Geneva, Ill. He was 82 years of age.

Mr. Renwick was considered a pioneer in the sand and gravel industry and was for most of his life identified with organizations promoting the devel-

Frank W. Renwick

opment of that industry. He was the first president of the National Sand and Gravel Association and has since been an enthusiastic participant in the activities of this body.

Born and educated in Elgin, Ill., Mr. Renwick was a member of one of the Fox River Valley's oldest families. His grandfather, Major George W. Renwick, served as an officer in the Civil War and was one of the pioneer founders of Elgin. As a young man Mr. Renwick in 1893 was engaged in real estate and contracting business with the Calumet Improvement Company at Harvey, Ill. In the course of this work he became interested in the gravel business, and in 1896 he built at Plainfield, Ill., one of the first gravel plants in that area.

At the turn of the century the Chicago Gravel Company was organized by Mr. Renwick and James A. Hart. At the time of Mr. Hart's death Mr. Renwick became president of the concern, a post he retained until his death. He is survived by a daughter and two sons, one of whom, George W. Renwick, is vice-president of the company.

An announcement released by the California Portland Cement Company states that the firm has moved its offices to the General Petroleum Building, 612 South Flower Street, Los Angeles 14, Calif.

U.S. Gypsum Co. to Build $1,500,000 Plant on Site Bought from Cement Firm

Former holdings of the Pacific Portland Cement Company at Gerlach, Nev., which were sold to the United States Gypsum Company last year will be the site of a $1,500,000 plant to be built there by the latter concern for the manufacture of plasterboard and wallboard. The facilities at Gerlach included a large gypsum quarry, an aerial tram and a screening-grading plant.

Bids are being considered for the erection of a large housing project, an electric distribution system and other facilities. The total cost of the scheduled improvements would approximate $3,000,000.

U. S. Gypsum plans to produce soil conditioners and other gypsum by-products, and is said to control extensive gypsum deposits near Lovelock and in other Nevada areas.

S. W. Portland Cement Co. Moves to New Office Building

The staff of Southwestern Portland Cement Company at Los Angeles recently moved into its new office building, an all-concrete structure located at the corner of Wilshire Blvd. and Ingraham St., near the downtown section of Los Angeles.

The ground floor of the structure has been leased to the Mutual Life Insurance Co.; Southwestern will occupy the remainder of the building.

The late Carl Leonardt, prominent in the early construction of Los Angeles, organized the Southwestern company in 1907. A year later, under the direction of Mr. Leonardt and Frank H. Powell, now president, the first plant was opened at El Paso, Tex. In 1915, it began operations at its Victorville, Calif., plant; and ten years later it acquired the third plant in its present chain at Osborn, O. With the completion of the new headquarters office building, administrative officials have vacated the offices formerly occupied in a building at 727 W. Seventh St., Los Angeles.

• Shown in the accompanying illustration is James Boyd (right) being sworn in as director of the U.S. Bureau of Mines by Chief Clerk Floyd Dotson (left). Secretary of the Interior J. A. Krug looks on. The ceremony took place on March 24 in the auditorium of the Department of the Interior. Dr. Boyd has served as Mines Bureau director under a series of recess appointments since August, 1947. Confirmation of his appointment was made on March 22 by the Senate.

The Brazilian cement out put in the January - September period of 1948 amounted to 805,801 tons, indicating that the production for the entire year passed the 1,000,000-ton mark, states *The Brazilian Bulletin*. Output in 1947 was 913,525 tons.

Solvay Company Disposes Of Plant Buildings at Winnfield Quarry Dome

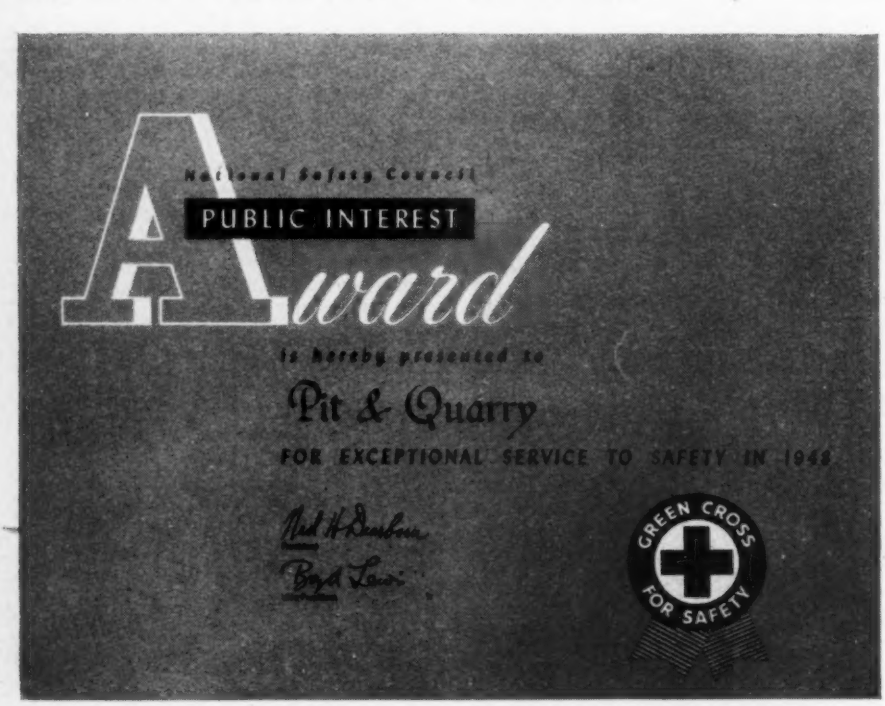
With the announcement that the Solvay Company had sold all buildings at its quarry near Winnfield, La., to the LaSalle Materials Company at Alexandria, La., it became definite that quarrying at the Winnfield dome had ended after 40 years of operation by several companies. The buyer will salvage the lumber and equipment.

Solvay, a subsidiary of Allied Chemical and Dye Company, has for several years shipped limestone from the Winnfield quarry to its chemical plant at Baton Rouge. The stone remaining in the quarry is not sufficiently pure to be used for this purpose. Solvay will continue to own about 1800 acres of land on and around the Winnfield Quarry dome. At present the Carey Salt Company is mining salt under the dome, which it has leased from Solvay under a royalty agreement of 99 years, dating from 1931.

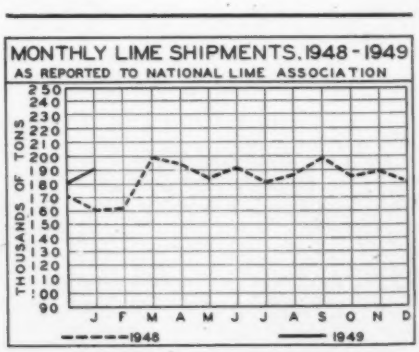
Semline Corp. Appointed U.S. Soper Representative

Soper Engineers, S. A., Panama, R. P., has announced the appointment of The Semline Corporation as its representative in the United States. Personnel of Soper Engineers, S. A., in the United States have joined the Semline Corporation. The Soper organization is headed by Ellis C. Soper, president.

Offices for the corporation have been opened in the Riggs National Bank Building, Dupont Circle, Washington 6, D. C. The concern offers complete engineering services, industrial design, surveys, industrial project development, and management. Melville L. Brown is president.



• This coveted certificate—the National Safety Council's Public Interest Award—now graces the walls of Pit and Quarry's headquarters. The council's Green Cross for Safety was presented for "exceptional service to safety in 1948."



According to data collected by the National Lime Association, 50 companies in January, 1949, shipped 190,786 tons of lime (129,585 quicklime; 61,201 hydrate). Reporting companies represent 58.9 percent of the association members' total capacity of record. Based on Pit and Quarry's estimate for the remainder of the industry, the total shipments for the month by all plants were approximately 356,000 tons. Shipments by uses and grades for January, 1949, were:

	Quicklime (tons)	Hydrate (tons)
Agricultural	663	8,008
Building	11,006	26,666
Chemical	117,916	26,527
Totals	129,585	61,201

Steelton Foam Slag Corp. To Produce Expanded Slag For Lightweight Concrete

Among newcomers in the lightweight slag fraternity is the Steelton Foam Slag Corporation of Baltimore, Md. The concern was organized by Richard T. Gumpert, who is its president; Lawrence J. Peters is secretary-treasurer.

Chief product will be expanded slag for lightweight concrete. Production is expected to begin at the plant on the Bethlehem grounds in Steelton, Pa., in the early part of May.

According to an announcement made by officials, every effort will be made to produce a constant-quality lightweight slag, screened sizes from ½ in. to ¼ in. for the coarse and from ¼ in. to powder for the fine.

Dravo Corporation Distributes $500 to Contest Winners

Awards totalling $500 have been given to 11 Dravo Corporation employees for writing the best papers submitted in the company's 10th annual technical papers competition. Checks were presented to the winners during the Dravo Engineers Club stag social at the University Club in Pittsburgh on March 22.

The top prize of $150 was won by Orval Auhl, general superintendent of Dravo's Contracting Division, for an article on the construction of Bluestone Dam at Hinton, W. Va., which was completed last December by Dravo.

Other prize-winning papers were written by R. D. Darrah, G. J. Green and D. H. Marlin. Among the entries receiving honorable mention were W. L. Price's paper on modernizing a sand and gravel dredge for the Warner Company* and that of Erle M. Hays on safety codes for materials-handling machinery.

"Skull Breaker" Works Mayhem On Costs at Eastern Quarry

At the operations of the White Rock Quarries, Inc., near Pleasant Gap, Centre County, Pa., a 4000-lb. manganese steel ball known as a "skull breaker" is presently in use in breaking large pieces of rock to obviate secondary crushing.

According to a circular released by the U. S. Bureau of Mines, this ball has resulted in a saving of 2.7 cents for each ton of limestone mined at this quarry, which has a daily capacity of 1500 tons.

Saticoy Rock Co. Completes Modernization Program

New improvements and additions at the Saticoy Rock Company's facilities at Ventura, Calif., includes plant modernization and a section which considerably enlarges the office building.

The ready-mix plant addition consists of a new material elevator, feeding batch bunkers with a capacity of 110 tons, and two cement silos with a capacity of 450 barrels each. Installation of new equipment in the plant makes possible the loading of 15 to 20 mixer-trucks per hour.

*Mr. Price's article was published in the October, 1948, issue of PIT AND QUARRY, page 98.

Town Secures Injunction Against Massachusetts Firm

A temporary injunction issued several months ago by the town of Boxford, Mass., against the Topsfield Sand and Gravel Company was recently made permanent. By stipulation of the counsel, ordered by the court, permission was granted to remove any loam piled up on the land, but no more may be accumulated.

Future operations may not extend beyond the banks of the limits previously laid down. The company may dig downward within the limits set, but may not extend operations farther toward Topsfield Road.

Four Ideal Cement Plants Cited for '48 Safety Records

Four Ideal Cement plants—those at Devil's Slide, Utah, Mobile, Ala., Superior, Neb., and Portland, Colo.—shared honors for safety scores in 1948 in the third annual Ideal inter-plant safety competition.

The Devil's Slide, Mobile and Superior plants are co-winners of the Charles Boettcher Annual Safety Award for the best safety record in completing the year without a lost-time accident. The Portland plant won the 1948 trophy for the greatest improvement in safety.

The Indian government has appointed a committee to consider the practicability of setting up a mica marketing control board in India. This body will also work out a detailed plan for the efficient marketing of mica, of which India has large reserves.

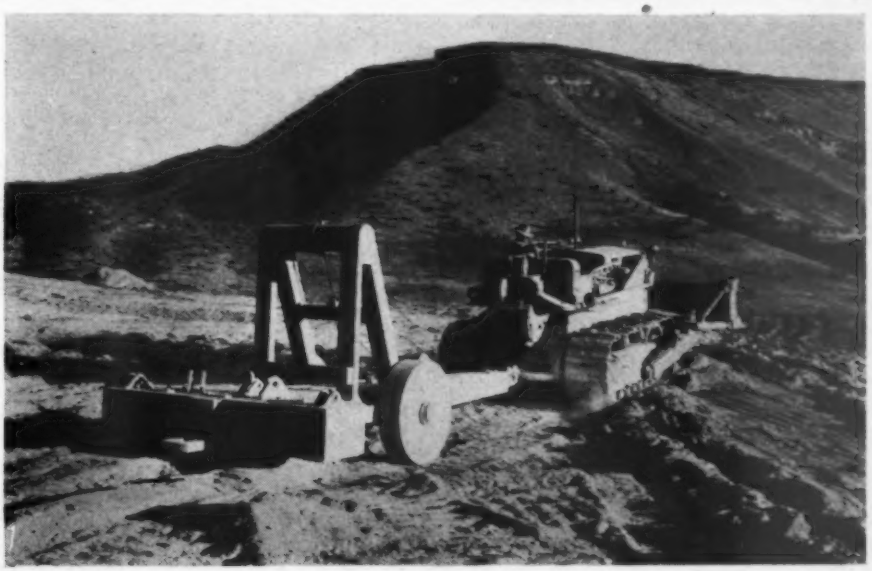
The Winnah! Guiberson Wins 8-Month Fight To Build $15,000,000 Plant

The right to erect a new cement plant at Palm Springs, Calif., was finally won by the Whitewater Portland Cement Company on March 29. The Riverside County Board of Supervisors, by a 3-to-2 vote, over-rode a previous recommendation by the county's planning commission and awarded the cement company, headed by Samuel A. Guilberson, a permit to build the plant. The board also created an unrestricted 4-mile-square industrial zone surrounding it.

Victory came after an 8-month battle between Palm Springs residents and Mr. Guiberson. Dwellers in the famed resort area had sought to prevent the erection of the plant on the premise that it would create a dust nuisance and "pollute the underground water supply". Arrayed against the Palm Springers were residents of Banning and Beaumont, less "exclusive" and more industrial-minded communities, who campaigned in favor of the new industry.

Mr. Guiberson, former Texas oil-man and industrialist, announced that erection of the $15,000,000 plant would start at once and that the most modern dust-collecting devices would be incorporated to eliminate any objectionable dust. He also revealed that the contract for construction had been awarded the McNeil Construction Company of Los Angeles. Completion of the 10,000-bbl.-per-day plant is expected early in 1950. Considerable machinery has already been purchased from the War Assets Administration. Core drillings have indicated the presence of 25,000,000 tons of limestone in the Guiberson deposit.

J. W. Sharp will be general manager of the operation. Mr. Sharp formerly was in charge of the plant of the Permanente Cement Company near San Jose, Calif.



• Seen in the accompanying illustration is a twosome employed by the Rodgers Construction Company, Portland, Ore., to rip up gravel in an old road. A "Caterpillar" diesel D8 tractor with a No. 8A bulldozer is teamed with a No. 28 ripper on this job near Warm Springs, Ore. The material recovered supplies the rock crushing plant operated by Rodgers.

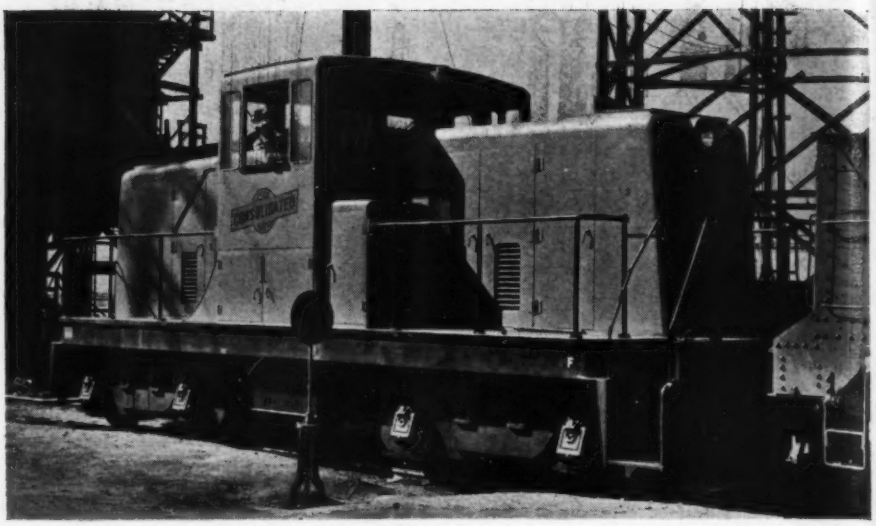
Diesel-Electric Locomotive Replaces Antique Steamer At Consolidated's Plant

A modern 65-ton General Electric diesel-electric locomotive has just gone into service at the Largo sand-and-gravel plant of the Consolidated Rock Products Co., Los Angeles. Built at Schenectady, N. Y., the locomotive rolled over the rails cross-country on its own wheels.

Two 6-cylinder, 275-hp. Cummins diesel engines, each direct-connected to a generator, suply power to four individual electric traction motors on the unit.

The new locomotive replaces an old oil-fuel steam engine which had been in switching service for 23 years. It is handling more cars faster and with less commotion that did the old steamer and is showing excellent fuel economy. For example, the old locomotive required 65 gallons of high-grade oil per hour, while the diesel-electric burns but 8 gallons of low-priced fuel per hour. This saving alone, according to Production Manager R. C. Griffin, amounts to $45 per 8-hr. day.

Although Largo plant workers have accepted the new locomotive as a necessary step forward in modern era, they are a bit nostalgic, too. The pulse-stirring sight and sound of the old steamer thundering up the grade, its drivers clanking and steam chests hissing, is now only a memory that old timers will have difficulty in erasing.



• Consolidated's new diesel-electric at its Largo sand-gravel plant.

14 Mexican Concerns Form National Cement Chamber

Camara Nacional de Cemento of Mexico, organized in November, 1948, by 14 cement-producing concerns, began functioning on January 1, 1949, with the following officers: Jesus Barrera (Cementos Mexicanos, S. A., and Cementos del Norte, S. A.), president; Federico Sanchez Fogarty (Cementos Mixcoac, S. A.), vice-president; Jaime Guraza, treasurer; Raul Arredondo, manager.

Member-companies, in addition to those mentioned above, are as follows: Cementos de Chihuahua, S. A.; Cemento Portland Nacional, S. A.; Cementos del Pacifico, S. A.; Cementos de Guadalajara, S. A.; Cia. Mexicana de Cemento Portland "Apasco", S. A.; La Tolteca, Cia. Mex. de Cemento Portland, S. A.; Cementos Moctezuma, S. A.; Cementos Atoyac, S. A.; Cemento Veracruz, S. A.; Cemento Portland del Bajio, S. A.; and Cementos Anahuac, S. A.

The purpose of Camara is to promote the use of cement and to further the interests of its associates. Headquarters are located at Bolivar 23-308 Mexico, D. F.

Basic Refractories Buys W.A.A. Facilities and Deposit

Howard P. Eells Jr., president of Basic Refractories, Inc., has announced his firm's purchase of a large deposit of magnesite in the Paradise Mountain Range, Nev., from the War Assets Administration. Included in the transaction were an adjacent ore dressing and calcining plant, as well as a large rotary kiln and accessory equipment from the government-owned alumina plant at Baton Rouge, La.

The Baton Rouge facilities will be installed at the magnesite plant and the entire layout will be converted to the production of magnesia refractories, supplementing the operation of Basic at Maple Grove, O. Conversion plans provide for the addition of a second rotary kiln at a later date.

Production in Nevada is expected to begin by July of this year, at which time the company will be producing a complete line of basic granular refractories.

Midwest PreCote Company Builds Rock Crushing Plant

A rock crushing plant to supply materials for bituminous pavements is currently being built for the Midwest PreCote Company of Kansas City, Mo. Midwest produces crushed stone, chats and riprap. Frank L. Carswell is president of the firm.

Concrete stave silos for the aggregate bins are being supplied by the Dodson Manufacturing Co., Inc., Wichita, Kan.

Dolese & Shepard Co. Sales Top $1,000,000 Mark in 1948

The Dolese & Shepard Company, whose agstone and crushed stone plant is located at McCook, Ill., has issued its 1948 financial report over the signature of President Albert R. Hock. Net sales for the year were recorded as $1,041,790.29, as compared with $810,505.71 for 1947.

Added to the firm's facilities during the year were a shovel, a crane, electric drills, a cement warehouse, quarry cars and screens. Other officers of the concern include the following: W. R. Carney, vice-president; W. J. Stoffel, treasurer; and B. P. Doody, secretary.

The Gypsum Products Company of Cody, Wyo., has been purchased from the Taggert interests by the Interstate Chemical Company of Seattle, Wash. The transaction included the company mill and warehouse north of Cody, and gypsum and sulphur holdings owned by Gypsum Products west of Cody.

John Walker, bulk plant operator at Ewing, Neb., for two years, has purchased the gravel-pumping equipment and trucks from S. Ebensgaard and is taking over operation of the Ewing gravel pits. Leland Welke of Ewing will manager of the bulk plant.

The National Foundation for Infantile Paralysis lists five precautions for those in charge of children. The rules should be carefully observed by persons of all ages.

1. **Avoid crowds and places where close contact with other persons is likely.**
2. **Avoid over-fatigue caused by too active play or exercise, or by irregular hours.**
3. **Avoid swimming in polluted water. Use only beaches or public pools declared safe by local health authorities.**
4. **Avoid sudden chilling. Remove wet shoes and clothing at once and keep extra blankets and heavier clothing handy for sudden weather changes.**
5. **Observe the golden rule of personal cleanliness. Keep food tightly covered and safe from flies or other insects. Garbage should be tightly covered and, if other disposal facilities are lacking, it should be buried or burned.**

Oregon Technical Council Studies Cement Needs Of Northwest in Survey

The Oregon Technical Council, a body composed of representatives from the professional engineering societies in Oregon, has completed a study of the cement plant capacity and cement needs for the Pacific Northwest. The Raw Materials Survey, Inc., Portland, Ore., through A. A. Bartell, managing engineer, presents its findings.

The minimum cement production to meet requirements in the Pacific Northwest for the next ten years is estimated to be 7,500,000 barrels annually.

Based upon a production of 72.5 percent of plant capacity (which is considered the best to be expected as an average over a ten-year period), the estimated total plant capacity required is 10,300,000 barrels per year, or 1,600,000 barrels more than the capacity of existing plants and facilities now under construction. The present capacity of the eight plants in the region is 8,100,000 barrels. This figure will be increased to 8,700,000 barrels some time in 1949 upon the completion of an additional kiln at the Lehigh plant at Metaline Falls, Wash.

The present plants are strategically located with regard to market and raw material supply — freight and economy.

Increased capacity is considered most justified in the Seattle, Spokane, Portland and middle-Columbia River areas.

It is recommended that the cement industry increase production without undue delay by approximately 25 percent to prevent any restrictions of normal growth of the Pacific Northwest.

According to K. E. Hamblen, a member of the cement-study committee, increased demand for portland cement in the Pacific Northwest since the end of World War II has created serious shortages. An estimate made in 1946 indicated that the region would, by reason of normal population growth, need about 2,000,000 barrels of additional cement capacity by 1960. It is now apparent that the estimate was too low. The demands upon the portland cement industry are as great today as the demand anticipated for 1960.

When the many large federal projects begin to get under way, their requirements alone will be in excess of 3,000,000 barrels of cement per year for at least the next ten years. With the present capacity of about 7,500,000 barrels per year in eight Pacific Northwest plants, and an actual production of a little over 5,000,000 barrels, it is obvious that if these projects are to be supplied with cement, some other customers must be neglected.

Wecker Sees Building Lag Offset by Public Projects

W. A. Wecker, president of the Marquette Cement Manufacturing Company, stated in a release accompanying the firm's annual (1948) financial statement that there is a possibility of a change in the supply-demand picture for cement during 1949. Mr. Wecker expects a decline in demand and an accompanying increase in the productive capacity of the industry. He also predicts a high rate of the use of older productive facilities.

The executive stated that although the construction forecast for the current year indicates a let-down in building activity along many lines this will be offset by increases in highway, public works and utility projects construction.

Marquette's net income for 1948 was given as $2,229,704, as compared with $1,902,716 in 1947.

$25,000 Cement Research Bill Vetoed by Gov. Aandahl

Gov. Fred G. Aandahl has vetoed a bill passed by the North Dakota legislature which would have provided $25,000 for a study by the State Research Foundation as to the feasibility of a state-operated cement manufacturing business. He stated that he believed a state-owned plant would not be a profitable venture.

George Olson, secretary of the executive committee of the North Dakota Nonpartisan League, has announced that petitions will be circulated to initiate a measure authorizing establishment of a state-owned cement plant.

U. S. Potash Co. Sales Rise As Facilities Are Expanded

Sales of the United States Potash Company, Carlsbad, N. M., both in tonnage and dollar volume, rose to new high records in 1948, according to the firm's recently released annual financial report. Net sales reached $10,904,325, as compared with $10,329,210 in 1947; net income made corresponding gains.

Horace M. Albright, president of the company, stated that the productive capacity of the plant is being considerably increased by the $2,500,000 expansion program currently being carried out.

Building Contracts Decline In Midwest and East During Jan.-March Term

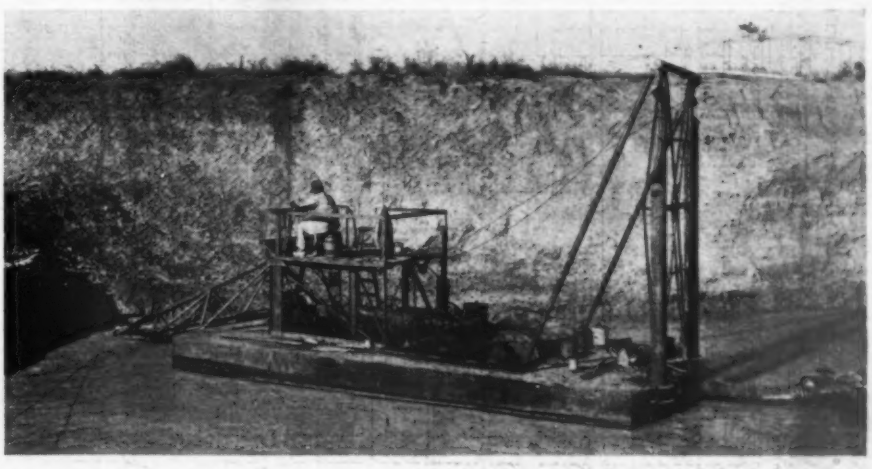
F. W. Dodge Corporation has reported that contracts awarded for building and engineering works in the first quarter in the 37 states east of the Rocky Mountains declined 9 percent from the corresponding period of last year. The first quarter total of building and construction awards was $1,799,070,000, as compared with $1,986,936,000 in the first quarter of 1948.

Despite the decline, the dollar volume total was the second-highest for a first quarter on record, being exceeded only by last year's corresponding quarter. March awards were up sharply over the total for March of last year, and reduced considerably the margin of decline shown for the first two months of the year.

Nonresidential building as a group showed a gain of 1 per cent in the quarter, with a total of $771,219,000. The increase was attributable mainly to public building contracts, the total for which was $42,751,000, as against $17,012,000 in the corresponding quarter of last year.

Residential building awards in the first quarter amounted to $603,971,000, as against $746,889,000 in the corresponding period of last year, a 19 percent decline. Contracts for single-family houses built to owners' orders for their own occupancy increased 23 percent, and dormitory awards jumped 43 percent; but other residential building classifications declined, with hotel contracts down 36 per cent, apartment house awards off 20 percent, and single-family houses built by operative builders for sale or rent down 32 percent.

Awards for streets, highways, bridges and other public works and for electric light and power, gas plants and mains, water supply systems and other public utilities totaled $423,880,000 in the first quarter to reflect a decline of 11 percent. These contracts include both publicly-owned and privately-owned facilities classified as heavy engineering works.



• An efficient piece of equipment used for dredging operations near Rio Hondo, Tex., which would be equally adaptable to sand gravel recovery is the seagoing digger designed by Affolter & Garnett, contractors of that city. The raft section is of welded steel, with standard ship deck plating. All driving machinery is housed in a special hold compartment, while engine and equipment controls are placed well above the deck level. Power is supplied by a General Motors Series 71 diesel engine, which is V-belt connected to a 6-in. centrifugal pump capable of throwing out 1800 gallons of water, mud and clay per minute.

30 years ago in Pit and Quarry

THE May, 1919, issue of PIT AND QUARRY was devoted very largely to the promotion of construction as the best insurance against an economic collapse. It was pointed out that with railroad rates lowered only 10 cents per ton, the price of cement had been lowered 50 cents per ton and lime $1.00 to $2.00 per ton, with proportionate decreases in the prices of aggregates and other building materials. It was argued in many quarters that prices could not be reduced further without additional freight rate cuts. The blame for the lag in construction volume was placed squarely on the bankers, investors and municipalities that were apparently waiting for further price cuts before committing themselves.

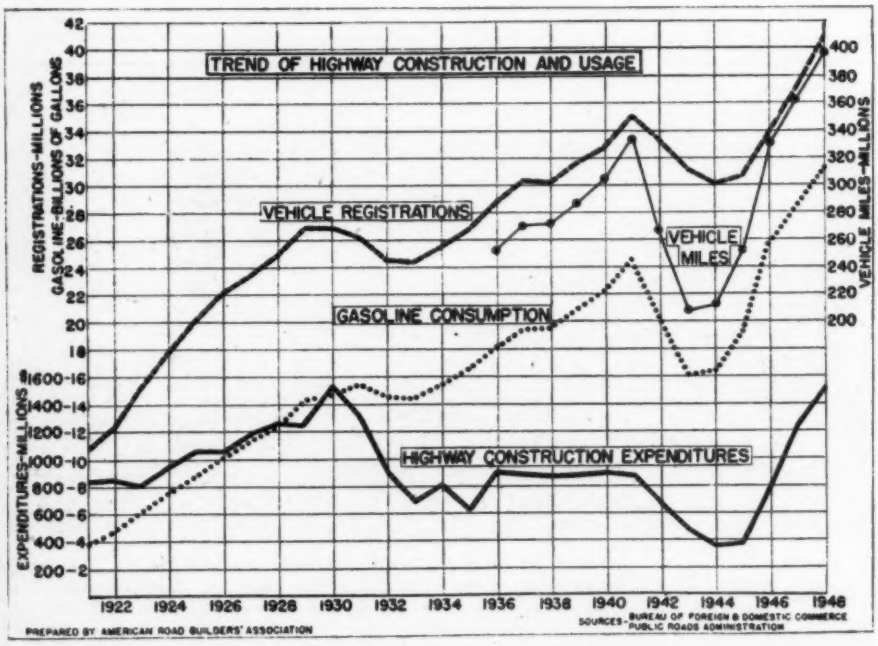
With the main convention season over the various national, state and regional associations were apparently busy with their routine affairs. Some, however, were working actively for further freight rate reductions. Prominently in the news in this connection were the National Crushed Stone Assn. and the Illinois Sand & Gravel Producers' Assn., both working through the director general of railroads and the Interstate Commerce Commission. The main editorial in this issue, "Is a Half Load Enough?" was a further plug for lower freight rates and for less discriminatory demurrage rulings.

The feature article in this issue was a progress story on the new wet-process plant of the Indiana Portland Cement Co. at Limedale, Ind., which was to go into operation later that year. This plant was to be the last word in design, with such features as all-reinforced-concrete construction, a single storage building for all materials except cement, a 10- by 240-ft. Power & Mining kiln, a 210-ft. concrete chimney, etc. The plant was designed by F. L. Smidth & Co. It is now operated by the Lone Star Cement Corp., Indiana Division. Adam L. Beck, president of this company, had been active in the cement industry in Oklahoma and later became president and manager of the Great Lakes Portland Cement Co., Buffalo, N. Y.

The economies possible through the application of modern quarrying methods were outlined in another of a series of staff-written articles. Various methods for conveying the rock from quarry to plant were described for three types of quarries: those below ground level, those on grade, and those above grade.

A wide variety of other subjects was discussed in this issue, including the role of overburden as part of the cement raw mix, the domestic production of grinding pebbles, the various types of detonators used for blasting, the saving of labor in secondary blasting, etc.

A filler advertisement in this issue explained why PIT AND QUARRY then carried, as it does now, more advertising than any other paper covering the sand, gravel, stone, cement, gypsum and lime industries. Six very good reasons were given.


TREND OF HIGHWAY CONSTRUCTION AND USAGE
REGISTRATIONS-MILLIONS
GASOLINE-BILLIONS OF GALLONS
VEHICLE MILES-MILLIONS
EXPENDITURES-MILLIONS
VEHICLE REGISTRATIONS
VEHICLE MILES
GASOLINE CONSUMPTION
HIGHWAY CONSTRUCTION EXPENDITURES
1922 1924 1926 1928 1930 1932 1934 1936 1938 1940 1942 1944 1946 1948
PREPARED BY AMERICAN ROAD BUILDERS' ASSOCIATION
SOURCES-BUREAU OF FOREIGN & DOMESTIC COMMERCE PUBLIC ROADS ADMINISTRATION

• A graphic presentation of long-term trends concerning highway construction and use as reflected in cost, mileage, gas consumption, etc.

States Exhaust Funds Provided for Road Building Under '44 Federal Aid Act

Virtually all of the federal-aid funds provided under the 1944 postwar Federal Aid Act have been expended on new roads, according to Col. E. R. Needles, president of the American Road Builders' Association.

"Out of a total authorization of $1,500,000,000, the sum of $1,425,394,287 has been expended for new highway construction completed or in the process of completion," Colonel Needles said. "This figure indicates that the states have matched the federal funds, as required under the act. They have done so in the face of higher costs and shortages of materials and labor because of the tremendous demand for new roads."

Figures from the Public Roads Administration show that as of January 31, 1949, some 68,741.6 miles of new highways have been built since 1945, when construction started under the post-war program.

"The trend in highway construction has continued upward," Colonel Needles pointed out. "The awards during the 1948 fiscal year amounted to $1,058,927,000, as compared to $817,742,000 awards by the state highway departments in the preceding year. Necessity for better highways will probably keep construction activity at a high level for the next few years."

Colonel Needles estimated that "it will take $60,000,000,000 and 15 to 20 years to get our highways in shape to handle present and future traffic demands. Federal aid must be authorized at the rate of $1,000,000,000 annually to meet this estimate."

The need for an extensive highway program is self-evident, the A.R.B.A. official observed. The number of vehicles using the highways and the volume of traffic on all types of roads have risen to new highs—and the trend continues up.

At the same time many highways are constantly in need of reconstruction, rehabilitation, and maintenance because of the lack of a continuing program during the war years. "Some states are finding it difficult to meet these rising maintenance costs and at the same time extend their highway system in accord with demands which will certainly be imposed upon them in the future," Colonel Needles asserted.

As of January 31, 1949, the states which had completed the largest number of miles of new highways were Texas with 6,071 miles, Minnesota with 2,917 miles, and Kansas with 2,874 miles completed.

Present indications are that the cement industry will exceed last year's production record of 204,000,000 barrels, according to D. S. MacBride, president of the Hercules Cement Co., Stockertown, Pa. He stated that Hercules is operating at capacity and in 1948 had the highest earnings in its history.

WASHINGTON NEWS LETTER

Interest Rates on Business Loans

another P.Q. and exclusive

The Federal Reserve Board has just revised its statistical data on interest rates received by commercial banks on business loans. These data should be of interest to every business man who borrows from his bank.

As of December, 1948, the average interest rate for short term business loans in the 19 cities selected by the Federal Reserve Board for study was 2.64 percent per year. But this average rate did not apply to every size of loan. The interest rate on large loans was lower than this, and the interest rate on small loans was one-third higher, as follows:

	Average Interest Rate per Annum Percent
Loans of $ 1,000 to $ 10,000	4.50
Loans of 10,000 to 100,000	3.58
Loans of 100,000 to 200,000	2.97
Loans of 200,000 and over	2.34
All loans	2.64

Furthermore, if the loan was made in New York, it was made at a lower rate than in 7 Northern and Eastern cities covered by the Federal Reserve Board where, in turn, the rates were lower than in 11 Southern and Western cities, as follows:

	Average Interest Rate per Annum Percent
Loans of $1,000 to $10,000	
New York	4.23
7 Northern and Eastern cities[1]	4.51
11 Southern and Western cities[2]	4.62
All cities	4.50
Loans of $10,000 to $100,000	
New York	3.40
7 Northern and Eastern cities[1]	3.60
11 Southern and Western cities[2]	3.68
All cities	3.58
Loans of $100,000 to $200,000	
New York	2.70
7 Northern and Eastern cities[1]	2.97
11 Southern and Western cities[2]	3.14
All cities	2.97
Loans of $200,000 and over	
New York	2.16
7 Northern and Eastern cities[1]	2.44
11 Southern and Western cities[2]	2.57
All cities	2.34

Finally, the interest rates on small business loans (less than $10,000) are far higher than they have ever been since the beginning of 1939. The rates on medium-sized loans

[1]Boston, Buffalo, Philadelphia, Pittsburgh, Cleveland, Detroit, Chicago.
[2]Baltimore, Richmond, Atlanta, New Orleans, Dallas, St. Louis, Minneapolis, Kansas City, Seattle, San Francisco, Los Angeles.

By S. HERBERT UNTERBERGER

($10,000 to $200,000) are higher than they have ever been since 1939, but only slighly higher than they were in early 1943. The rates on large loans ($200,000 and over), while higher than in most of the period since 1939, are, nevertheless, the only category in which the rate is lower than it was in 1943. This may be seen from the following table:

Period	Average Interest Rate per Annum for Loans of			
	$1,000 to $10,000	$10,000 to $100,000	$100,000 to $200,000	$200,000 and Over
1939—March	4.4	3.2	2.1	1.8
June	4.4	3.1	2.2	1.8
September	4.4	3.1	2.1	1.8
December	4.3	3.0	2.0	1.8
1940—March	4.2	3.0	1.9	1.8
June	4.2	3.0	2.1	1.6
September	4.3	3.0	2.0	1.9
December	4.3	3.1	1.8	1.9
1941—March	4.3	3.0	1.9	1.8
June	4.3	3.0	1.8	1.9
September	4.2	3.0	2.0	1.6
December	4.3	3.1	2.0	1.7
1942—March	4.3	3.0	2.0	1.7
June	4.4	3.2	2.1	1.8
September	4.4	3.2	2.2	2.2
December	4.4	3.3	2.4	2.1
1943—March	4.3	3.3	2.3	2.5
June	4.3	3.4	2.8	2.8
September	4.4	3.3	2.4	2.1
December	4.4	3.4	2.6	2.3
1944—March	4.4	3.4	2.7	2.2
June	4.2	3.4	2.5	2.3
September	4.4	3.3	2.6	2.3
December	4.3	3.1	2.5	2.0
1945—March	4.4	3.3	2.6	2.0
June	4.4	3.3	2.3	2.0
September	4.2	3.1	2.3	2.1
December	4.2	3.0	2.0	1.8
1946—March	4.1	3.1	2.3	1.7
June	4.2	3.1	2.2	1.7
September	4.0	3.1	2.1	1.7
December	4.4	3.2	2.1	1.8
1947—March	4.3	3.1	2.5	1.8
June	4.1	3.1	2.6	1.8
September	4.1	3.1	2.4	1.8
December	4.1	3.2	2.5	1.8
1948—March	4.2	3.3	2.5	2.1
June	4.49	3.47	2.70	2.16
September	4.53	3.58	2.89	2.29
December	4.50	3.58	2.97	2.34

Of special interest and of concern in some quarters is the rapid rise in these interest rates in the last year. The average rate in December, 1948, was 2.64 percent, as compared with 2.1 percent in December, 1947. This 26 percent increase over the period of a year might reflect a growing concern on the part of the banking community over the ability of American business to repay its borrowings.

How Deep a Depression?

With prices, production and personal incomes falling somewhat, many persons, including businessmen and congressmen, are coming to the conclusion that we are in for a full-scale depression. Others think that we are experiencing a wholesome readjustment, while a few scattered voices, most notably the majority of the President's Council of Economic Advisors, are contending that inflation is still the nation's principal economic problem.

Assuming with the current majority here in Washington that we are headed for a downward adjustment, how far down are we likely to go? That question is being asked everywhere, but few are courageous enough to frame an answer. Certain prophets of doom say that we are up so high that the next depression will make 1929-32 look like a minor readjustment. Most observers anticipate nothing that drastic. The figure that is heard most often is that we can expect a fall of no more than 15 percent in production and prices before the economic situation will become stabilized. However, when these 15 percent prophets are pressed as to how they arrive at that figure, they are not able to point to any firm basis for their estimate.

The principal factor in the picture is what the government's policy will be. If deflation continues, the government can and probably will further ease installment credit. Perhaps all restrictions will be removed. It probably will keep interest rates

(*Continued on page* 85.)

Let's Do More About Major Accident Problems

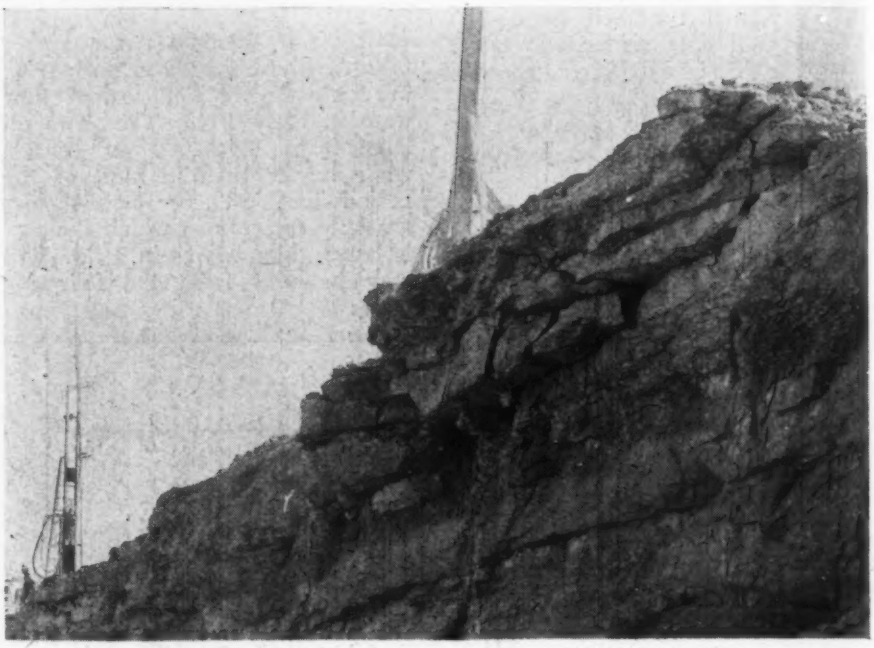
By G. G. GRIEVE
Senior Safety Engineer
National Safety Council

another P&Q exclusive

SPLENDID safety records have been made by quarry companies in various parts of the country. Some of the large companies have equalled the records of organizations in much less hazardous industries. Individual quarries have worked as long as ten years without a single lost-time injury to an employee. Nevertheless, the accident experience of the industry as a whole can be improved considerably.

Quarries with active safety programs average about 17 lost-time injuries for each 1,000,000 man-hours worked, according to data collected by the National Safety Council. Where little attention is given to accident prevention, the frequency of injuries averages at least two to three times larger. The occurrence of a few disabling injuries each year in a relatively small organization, such as is required to operate most quarries, is deceiving. Actually the number may be large in proportion to the number of employees. Also, it is only a matter of time before a man is killed or seriously hurt in hazardous work.

Even the substantial group of companies with relatively favorable accident experience must reduce injuries still more to attain a reasonable standard of safety in their operations. This standard is 13 lost-time injuries per 1,000,000 hours worked—the average for all American industries.



• Loose rock on the quarry face is the principal hazard in quarry work.

Quarry operators who have made consistent efforts to eliminate permanent disabilities and deaths during the last 18 years have achieved results exceeded only by companies in a few industries. The total improvement in the average severity rates (number of days of disability charged per 1,000 hours worked) of these companies during this period has averaged 66 percent. Yet serious hazards are so numerous in quarry work that, in spite of this progress, these quarries were fourth from the bottom in a list of 40 major industries ranked according to their 1947 severity rates.

It is apparent from these facts that the major problem still is the prevention of serious injuries. Of course, the elimination of frequent temporary disabilities should not be overlooked in any plan for preventing serious injuries. Both problems exist in most companies. The $64 question is "What can each quarry do to solve them?"

The fundamental characteristics of the occurrence of accidents suggest some helpful answers. Contrary to a widely expressed opinion, the severity of an accidental injury is not entirely a matter of chance. Studies show that the number and severity of injuries differ according to the type of equipment or material involved in accidents.

The number and severity of injuries involving the same type of equipment likewise depends on the causes and other circumstances of the accidents. Furthermore, the circumstances of the great majority of accidents in an industry follow a definite pattern year after year. Let's see how these characteristics of accidents can be used advantageously.

We are particularly interested in protecting quarrymen from death.

• Working too close to mobile equipment is a dangerous practice.

A sound approach to this job is to find out where quarrymen are killed. A recent compilation by the Bureau of Mines covering eight recent years discloses the principal sources of deaths.

	Percent
Falls or slides of rock, walls or overburden	28
Explosives	20
Haulage	13
Falls of persons	10
Machinery	9
Electricity	4
Handling objects	2
Other sources	14
Total	100

The first two major sources of fatalities—explosives and falls or slides of rock and overburden—accounted for almost *one-half* of the total deaths in the entire industry. Falls and slides of rock and overburden consistently formed the principal source of accidents throughout the eight-year period, and the other sources accounted for the same relative percentage year after year. This pattern will continue in the future unless more effective safety measures are taken.

Since the prevention of accidents from falls and slides of rock and overburden offers the largest opportunity for saving the lives of quarrymen, special attention should be directed at this source. Efforts to eliminate deaths also can be expected to reduce less serious injuries which occur frequently from falls of rock.

While we now know where to direct efforts, we do not know what to do. The causes of accidents point to the required preventive measures. Some safe procedures, such as wearing hard hats, apply generally throughout the industry. Other safety methods must be selected to fit particular operations.

The initiative and responsibility for selecting and putting into effect safe methods and practices is a function of management. The most effective approach to the job of reducing the large number of serious injuries from falls of rock and overburden is for management to adopt safeguards and working methods which will eliminate exposure of employees to the hazard. One of the first safeguards at quarries on side hills is to strip the overburden to bedrock for at least 15 feet back from the face. Sloping the overburden to less than the angle of repose and stopping movement of material over the top of the wall with baffle boards or similar safeguards will prevent material from washing and sliding into the quarry.

• This worker apparently has not looked where he is stepping.

Improvement in primary blasting practices will eliminate some rock falls from the face and some rock from rolling down piles. Poorly placed holes, insufficient powder, faulty loading and other inefficient blasting practices are often causes of hung-up rock. If the blast fails to force the rock out far enough from high faces, the pile is often dangerously high, and men take chances in undermining the bank or inducing a slide to get stone within reach of the shovel. In the considered opinion of some quarrymen, banks should be limited to 20 to 25 feet in height because a trained shovel operator can almost eliminate trimming by hand.

Insufficient fragmentation by the primary shot requires secondary breaking, often done by jackhammer men. Since they are injured more frequently by falling rock than are other employees, their exposure to the hazard also is reduced by improved primary blasting practices. Some companies have considerably increased fragmentation and have thus reduced the work and exposure of jackhammer men by adopting delay blasting.

In other quarries the drop ball is used for secondary breaking. This method is much safer than blasting because exposure to falling rock is practically eliminated.

In quarries where secondary blasting is the practice, the shovel can be utilized in various ways to reduce exposure to loose material from drilling too near the face. The operator may set a large rock out a safe distance from the face for drilling. If the rock is too large to handle, he may dig under it so that it will slide down the bank away from the face. Small shovel operators may be instructed to dig around a large rock which cannot be handled, and to leave it until after the next primary shot when it will be a safe distance from the new face and can then be drilled.

The circumstances of numerous accidents year after year prove that inspection of the face for loose rock is a "must" in any good work procedure. The requirement should come directly from the top official if necessary, and should specify that the face must be examined for loose rock after blasting and after freezing, thawing, or heavy rains.

Scaling cannot be done too thoroughly. Of course, the bar man should wear a safety belt secured by a rope to a steel rod at the top, and all men and equipment on the quarry floor should be in the clear. The safe procedure for bar man is to work from the top down foot by foot, testing and removing loose rock. He must particularly observe the safe practice of standing above or to one side of the rock which he is prying. If there is any question about whether or not a rock is tight, it is safer to blast it down than to take a chance on its becoming loose from vibration or weather conditions.

Furthermore, each employee should be so thoroughly informed about this serious hazard that examining the face or pile before entering the danger zone to perform any duty becomes a habit. This habit is most likely to be developed when management and supervision have demonstrated their interest and sincerity by adopting the safeguards and methods which are beyond the employee's responsibility.

There are other methods that might be mentioned. The solution to the falling rock problem, however, is not entirely a matter of devising safe methods. Safe working procedures are effective only when followed strictly to the letter. How thoroughly inspections of the face and other precautions are incorporated in operations will largely determine the industry's success in preventing future accidents from falling rock.

Now let's examine the principal problem in reducing nonfatal injuries. First, what is it? Data from the U. S. Bureau of Mines give the following information about the occurrence of nonfatal cases in a recent year.

	Percent
Handling materials	24
Falls of persons	11
Flying objects	10
Machinery	9
Haulage	9
Falls of rock—overburden	9
Drilling and channeling	6
Hand tools	5

Falling objects (not classified above)	4
Other sources	13
Total	100

Manual handling of material, as in most industries, is easily the outstanding source of nonfatal disabilities, accounting for almost one-fourth of all lost-time cases. In each quarry, therefore, this source is the logical major point of attack in efforts to reduce the frequency of injuries.

The prevention of handling materials accidents is often neglected. To shy away from the problem because age or physical defects of employees are sometimes factors in the occurrence of injuries from this source, or because the injury may have been sustained at home or elsewhere, or because the injury is alleged as an explanation for a few days away from work, indicates unwillingness to face the facts. The prevention of handling accidents is essential for a good safety record and worth while for other reasons.

Manual work of this type is often fatiguing and aggravates physical weaknesses of employees. Heavy lifting and other hard work probably create more dissatisfaction with a job than any other cause except wages. Safety measures make the work easier and thus minimize objections to it.

Mechanical handling equipment should be used to lift and to transport heavy equipment wherever it is practical to do so. Although motor trucks have replaced rail transport in many quarries, rails and ties continue to be involved in numerous handling accidents. Track is so assembled in some pits that whole sections are lifted and placed by shovels.

The use of tools for handling materials manually not only eliminates many hazards, but also enables the worker to do the job more easily. Cuts and punctures from sharp edges, slivers, and burrs, and serious infections are prevented. The handle of the tool provides a firmer grip and the hold of the tool on the material is likewise firm so that there are fewer fractured fingers and feet from the dropping or setting down of heavy loads. Tongs, for example, facilitate the handling of rails and ties, especially when the latter are wet or muddy. Tie tongs, however, must be kept sharp.

Tools for moving or shifting loads must be used correctly. Pry bars for track work and barring down rocks are probably involved in more accidents in quarries than any other type of tool. A secure "bite" and a firm footing with the feet well apart are essential for safe use of this tool. This stance enables the employee to retain his balance in case the bar slips.

Repairmen are frequently injured in handling the heavy machine parts required by quarry equipment. A typical cause of an accident in a shop is an employee's attempting to lift or remove a heavy part from a truck instead of using a hoist.

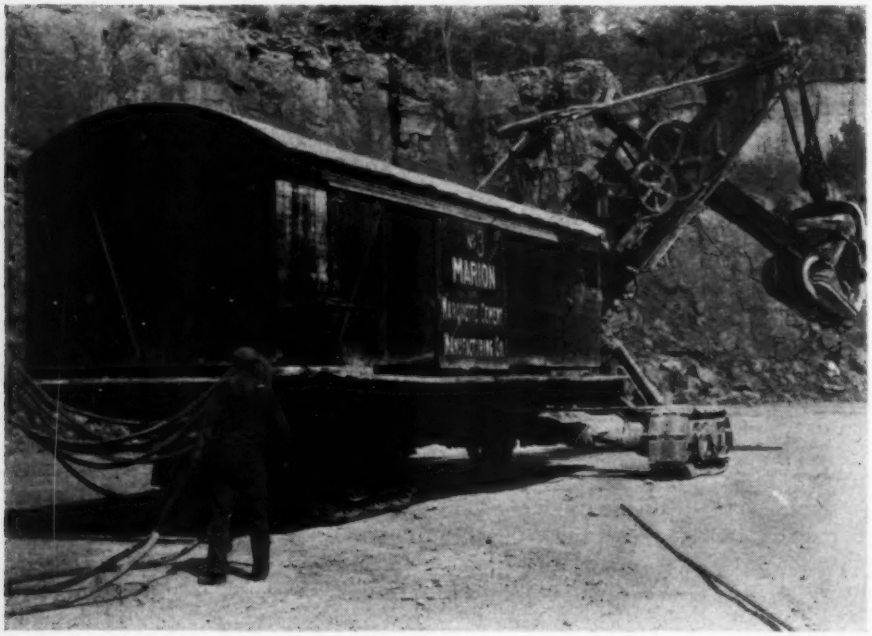
To get a heavy part in place on equipment and to hold it and secure it is a job requiring several men or, in many cases, blocking. Attempts to change the blade of a bulldozer without blocking have frequently resulted in injuries. A crane mounted on a truck has been recommended for transporting and handling heavy loads in repair and other work around the quarry.

Although numerous mechanical methods can be substituted for manual handling, a great deal of lifting and carrying of loads by hand will continue to be necessary. The work can be made easier and safer if employees are trained in at least the principal safe practices. These fundamentals include the following precautions:

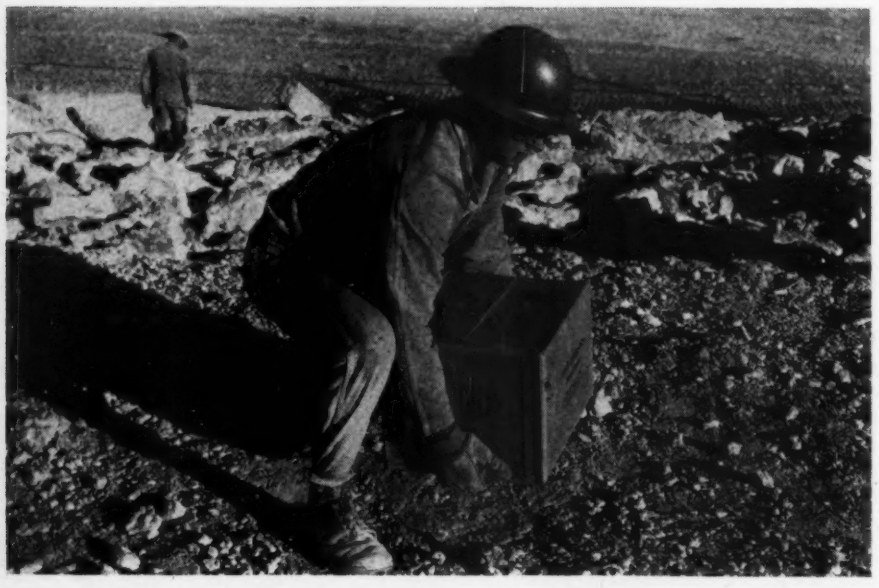
1. A heavy load should be shifted to a convenient place where footing is not slippery or where the employee will not have to lift with his feet on different levels or from another awkward position.

2. Sufficient help should be made available for the handling of heavy

(*Continued on page* 85)



• Storing and handling cable properly eliminates a major electrical hazard.



• Above: Using the strong leg muscles helps to lift loads easily.

Dant & Russell Capitalize On Big Outlet for Perlite As Plaster Aggregate

another ON THE SPOT report

By HARRY F. UTLEY

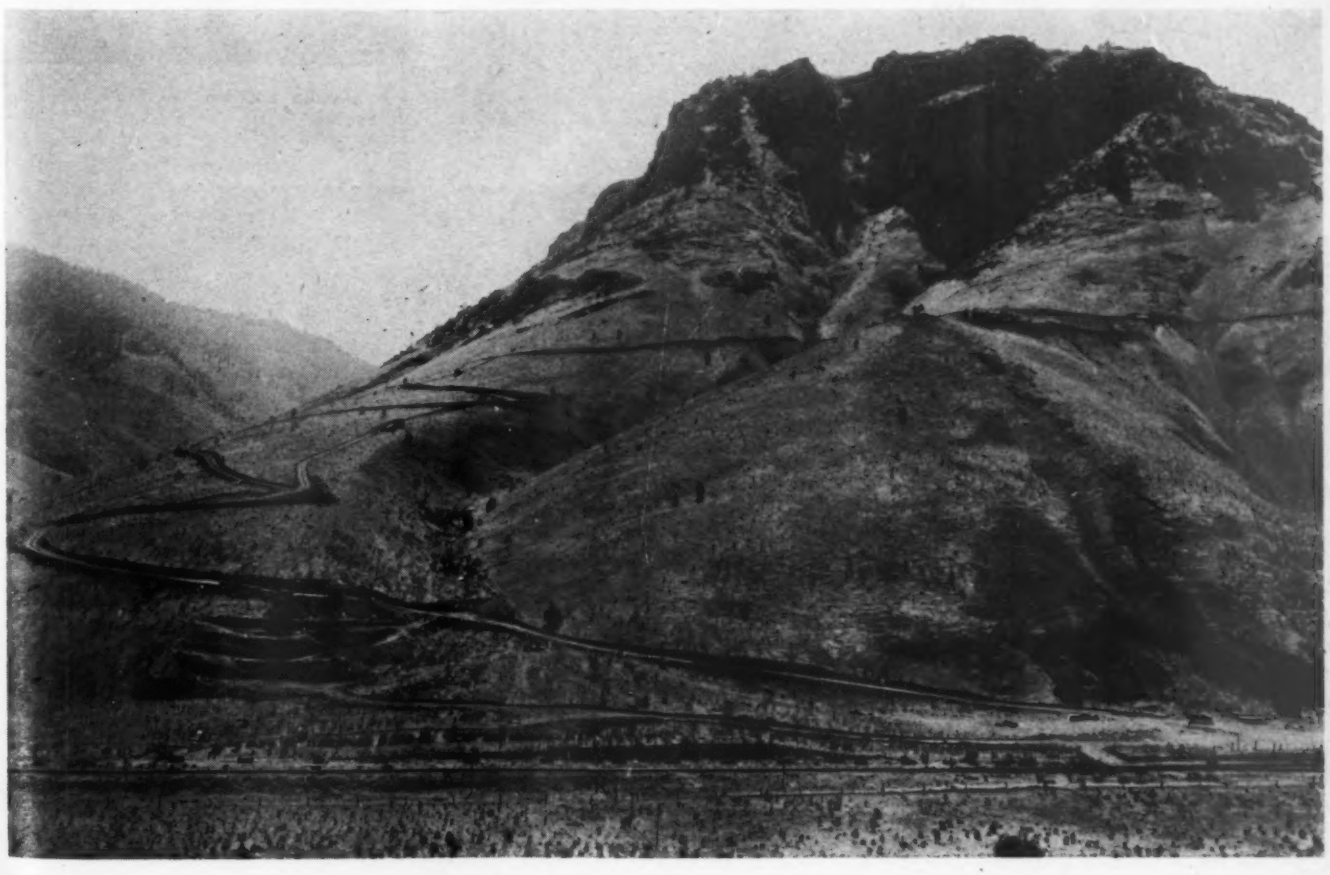
AMONG the nonmetallic minerals upon which considerable attention has been focused in the post-war period is perlite. In the West, particularly, numerous small plants have been "popping" the rock, but in most cases making little commercial progress.

This writer, whose orbit of operations has been confined to the Pacific Coast for the last four years, has visited many of these plants. Few have been successful. Earlier it was hoped that expanded perlite might revolutionize the lightweight concrete industry, but the aggregate has so far proved to be somewhat light in weight and too low in strength and unmanageable in the mix to make important inroads in this field. Special mixing and placing methods however, are overcoming some of these obstacles.

Considerable early research in the field of perlite was instituted by the firm of Dant & Russell, Inc., of Portland, Ore. A "giant" of the lumber industry, with vast timber holdings and sawmills in the Northwest, and producer and marketer nationally of FirTex wallboard, the firm came to the conclusion that expanded perlite had its particular use cut out for it as a plaster aggregate and decided to develop the material primarily for that market. Its output of expanded perlite is today being marketed under the brand name of "Dantore". It weighs in the neighborhood of 12 lbs. per cu ft., as compared with 85 lbs. for natural sand, which it replaces in plaster. In the average house it thus eliminates 7 tons of useless weight. Plaster using Dantore aggregate is said to be extremely easy to mix and apply, insulates against heat and cold and, most important, has high acoustic value. Its average noise-reduction coefficient has been found to be .55 plus. Too, the microscopic glassy globules of expanded perlite are resilient enough in adjusting to the stresses of settling to reduce checking and cracking of plastered walls to a marked degree.

Since the product was introduced to the plastering trade in the Pacific Northwest a year or so ago, sales have shot upward, acceptance being spurred onward by a broad advertising campaign directed both to the plastering contractors and the consumers. Portland's finest office structure, the 14-story Equitable Bldg. just completed, utilized the product throughout in its plastered walls, thereby eliminating an estimated 1,200 tons of dead weight with a corresponding saving in structural steel, to say nothing of the saving in wear and tear on human nerves by absorbing the day-long clatter of countless typewriters and the raucous voices of insurance agents.

The Dant & Russell perlite deposit is located along the Deschutes River, south of Maupin in north-central Oregon, the ground ore being shipped 130 miles by rail to the plant at St. Helens, a Portland suburb for processing. When operations began in August, 1945, the perlite was mined by the tunnel method but this was abandoned shortly in favor of an open quarry. Overburden ranges up to 8 ft. in



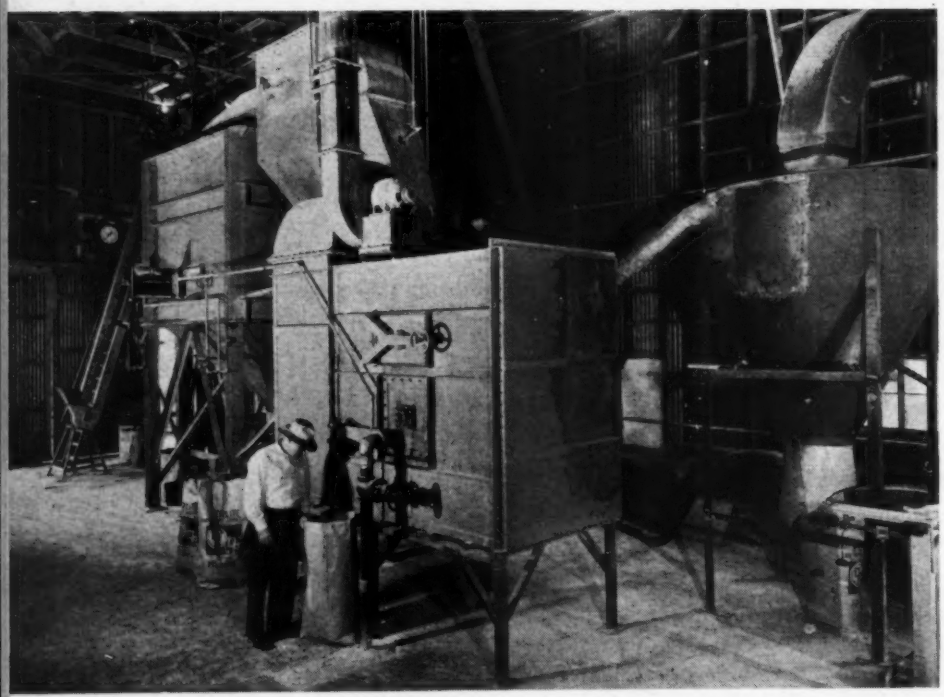
• The Dant & Russell perlite deposit at Maupin, showing the mountain road from the quarry to the plant.

depth, is stripped by a Pacific 36-in. scraper pulled by an Ingersoll-Rand 2-drum "Utility" air hoist and overcast into a convenient canyon. Chicago Pneumatic jackhammers, wagon drill, and a CP 315 compressor are used for drilling, and the perlite rock is shot down in small quantities at frequent intervals. A 1-cu. yd. Traxcavator loads the blasted rock into trucks which deliver to the crushing and grinding plant located down the mountainside about a mile and adjoining the tracks of the Oregon Trunk Line R.R.

The grinding plant has been turning out about 40 tons of finely-sized raw perlite daily. Primary crushing is done by a Rigdon 5- by 8-in jaw crusher, the minus ¾-in. product being ground in a Marcy 2- by 6-ft. rod-mill, a Tyler Hum-mer 4- by 5-ft. wet screen following in closed circuit with the mill. Undersize goes to a Wemco hydroseparator where the extreme fines are removed and wasted. The product of the hydroseparator is then drained in bins before being loaded into paper-lined box cars for shipment to St. Helens.

The St. Helens operation was developed primarily as a pilot plant by Elko Zoradi, designer of the kiln-type furnace which "pops" the perlite ore, and now production manager of the Dantore Division of Dant & Russell. It can handle not more than 4 tons per hour of raw perlite and has been operating 16 hrs. daily in an attempt to keep pace with the growing demand for the product. As a consequence, plans are now in preparation for a new and enlarged plant, to be erected on the waterfront in Portland.

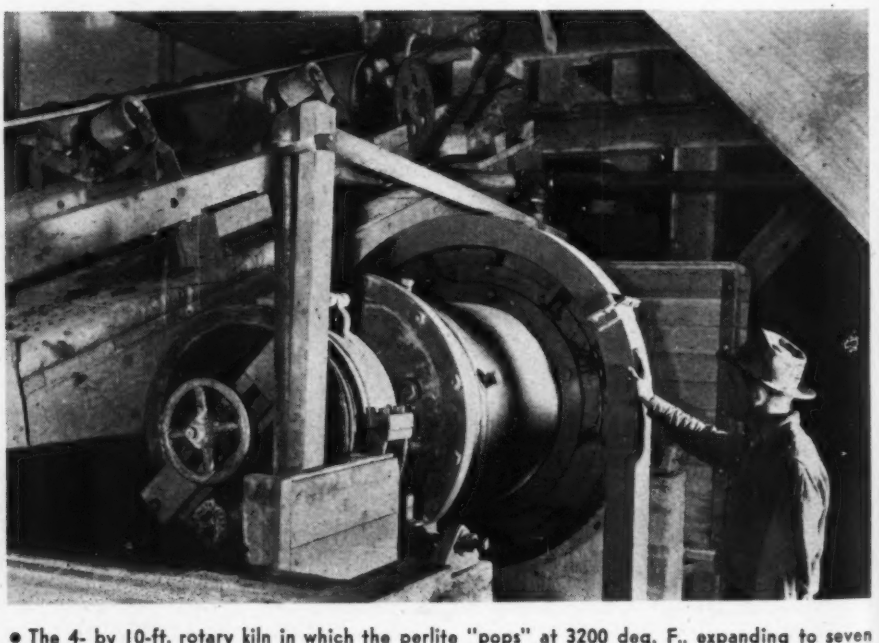
At St. Helens, the cars are unloaded, the perlite "sand" stockpiled under cover and dried in a 7- by 35-ft. rotary drier before being introduced into the furnace, or rotary



• A general view in the St. Helens plant. The kiln is behind the cooler at the left (not visible).

• A closeup showing the feed from the storage bin to the jaw crusher.

• John Dwyer, mill foreman at the Hum-mer 4- by 5-ft. screen which handles the rod mill oversize.



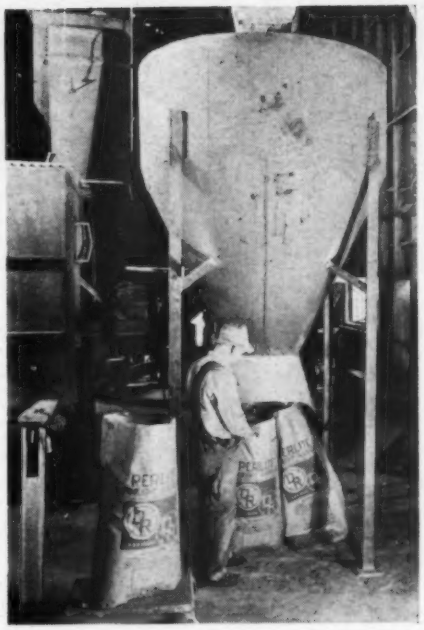
• The 4- by 10-ft. rotary kiln in which the perlite "pops" at 3200 deg. F., expanding to seven times its original volume.

kiln. The kiln, 4 ft. in diameter and 10 ft. long, is lined with Harbison-Walker refractory clay. It is fired by a 5-jet Ransome burner using propane gas as fuel. It is pitched 1 in. per foot and turns at the rate of 9 r.p.m. Maximum temperature is 3200 deg. F. at which point the perlite grains pop, expanding 7 times their original volume. The kiln is allowed to cool down at night and is pre-fired for 45 min. in the morning.

From the kiln, the expanded perlite is air-separated to meet ASTM grain-size specification C35-39 for plaster sand, the dust-laden gases passing through a curtain spray of water before being exhausted into the atmosphere. The product is packed into 4-cu. ft. paper bags for shipment, either as Dantore lightweight plaster aggregate, or as ready-mixed acoustical and fibred plasters.

The company recently fabricated another Zoradi kiln, a duplicate of the one used at St. Helens, and shipped it to Grand Rapids, Mich., for installation in a new perlite processing plant being established there by the Gregg Lumber Co. The Grand Rapids plant, just now getting into production, is receiving its ground perlite by rail from the Dant & Russell quarry in Oregon. It is seeking a source of supply closer geographically to Michigan, however, and is reported to be arranging for shipment of its raw material from Colorado in the near future.

Mr. Zoradi, who supervises the production end, makes his headquarters at the St. Helens plant. Fred D. Gustafson is resident engineer and John Dwyer, mill foreman at Maupin. Sidney Burts directs the sales of Dantore from the headquarters of the division which were recently established in the new Dantore-plastered Equitable Bldg. in downtown Portland.



• Filling the 4-cu. ft. paper bags with expanded perlite at the St. Helens plant.

Washington News Letter

(*From page* 79)

low and may reduce required bank reserves. The Reconstruction Finance Corporation may make more liberal loans to business. Taxes may not be raised and may even be lowered. To sum it up, the government has the power to give the economy a shot in the arm, but it can do this only by spending more money than it takes in, that is by running at a deficit.

Even if the government did nothing new, the programs already in operation, which cannot be reversed because they are tied up with firm commitments, will do much to put a brake on any developing depression. For example, foreclosures on a big scale are unlikely and even impossible because of the operation of the F.H.A. mortgage insurance program. Federal Deposit Insurance will similarly prevent widespread bank failures. Farm prices cannot fall disastrously because of government support; and personal incomes cannot vanish completely overnight because of unemployment and old-age insurance. Thus the most dramatic aspects of the last depression, which created a fear psychology and thereby worsened the situation, will not reappear with the same suddenness, if at all. The danger is that this catalogue of measures will create a false sense of security. It should be recognized that they are principally treatments of the symptoms of depression. They do very little in getting at the basic causes which make the American economy fluctuate so widely. Some of the more profound analysts here in Washington are concerned that although a depression is not likely to be heralded by a stock market crash and polished off by a wave of bank failures, it could still come creeping in by a progressive slowing down of our economic machinery. The full problem then would not be recognized because we would become gradually used to each successive stage.

Major Accident Problems

(*From page* 82)

and bulky loads.

3. When two or more men handle a load together, one should signal when to lift or lower.

4. The hold selected should provide a good grip, to be maintained in lifting, carrying, and placing the load.

5. A load should be gripped in such a way that the hands will not be pinched between the load and a nearby object when the load is pushed, pulled or slid. Likewise, clearances between the load and nearby objects and structures must be watched in carrying and other movements.

6. Men should lift with their backs straight. They should bend their knees so that their hips are directly below their shoulders and should have their feet together. The strong leg muscles actually lift the load. It is brought straight up without twisting the body or lifting quickly or jerkily.

7. Loads should be set down and not thrown or dropped so that they bounce or roll. Setting loads on blocks prevents injuries to the hands and feet and makes lifting and lowering easier.

8. Suitable gloves and safety shoes are necessities for avoiding injuries in manual handling. These types of personal protective equipment should be readily available to employees, and they should be encouraged to wear them. Members of the Cement and Quarry Section of the National Safety Council have adopted various ways for employees to obtain safety shoes conveniently. For example, arrangements often are made with a shoe merchant to carry a supply of good quality. He should be particular about fitting them correctly.

Essential to the prevention of injuries from manual handling, falls of rock, and other sources, are better understanding of the hazards, knowledge of safe practices and recognition of the necessity for observing them on the part of employees. New employees, especially those *with less than one year of experience*, are paying the penalty for inexperience and lack of training. They are sustaining a very large proportion of the injuries in the industry—40 percent. Practical and effective programs for training new men in safe working practices are well known. The general adoption of a training program for the new worker will be a big factor in determining whether or not past major accident problems will be the industry's major accident problems in the future.

Screenings

by William M. Avery

BY way of refuting our recent critical remarks regarding the sand-and-gravel school of humor, this has been submitted as Exhibit A for the defense:

The vaudeville theater (obviously this isn't a contemporary yarn) in a Western town was located next to a gravel pit. Before going into the

show the natives made it a practice to fill their pockets with gravel, which they tossed at the actors in order to register displeasure with the performance. In showing their disapproval (get ready now; this is the punch line) *they left no turn unstoned!*

No Foresight

SCIENTISTS have just discovered that they can about quadruple the size of fish by fertilizing breeding ponds with a mixture of phosphorus, nitrogen, and potassium. No doubt it's a fine, upstanding project, and we're mighty glad to see the nonmetallic minerals right up there in front, but one thing bothers us a little. Unless somebody figures out a way to double the length of the human arm, how the heck are fishermen going to describe the ones that get away? That's the trouble with these scientists—they never look ahead far enough.

Hi Yo Super Rope!

WE'VE just finished reading *The Wonders of Wire Rope,* an epic prepared in comic book style by an outfit that calls itself Educational Comics, Inc. Since the present trend indicates that in a few years comic books will completely dominate the publishing field, this little opus is probably a fair sample of what the next generation of PIT AND QUARRY readers may expect to find in their favorite journal.

The book starts out in slam-bang fashion with Jimmy Hale delivering lunch to his pop, who is a shovel runner in a stone quarry, at the precise instant that an outsize boulder comes thundering down from above. The lad stumbles and falls directly

in its path. From the cab of the shovel Pop Hale coolly sizes up the situation, swings his dipper stick through an arc of 90 degrees, and neatly catches the boulder in the bucket. The wire rope quivers and strains, but takes the blow, and Jimmy is saved from certain death.

Next day the entire Hale family

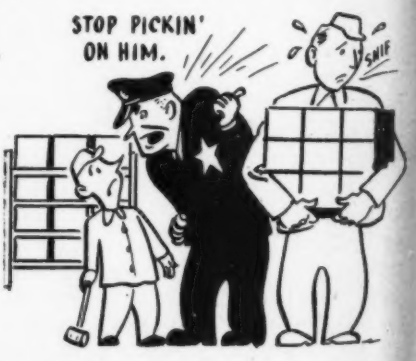
goes barging off on a cross-country vacation, in the course of which they visit all the places Mrs. Roosevelt has ever visited, plus a few (this is hard to believe) that even she never heard of. They spend all their waking hours hunting for applications of wire rope, and they really find a slew of 'em. The reason for this lopsided diet isn't explained adequately, but it seems to have some vague connection with their gratitude for the miracle that saved Jimmy.

The going gets a little too sticky even for the author, who tries to ease his conscience somewhere along the line by allowing Sister Nancy to blurt, "What a silly way to spend a vacation!" She's the only rational character in the book.

Camera, Action!

AN item from Castaic, Calif., states that film actor Robert Mitchum was put to work in the concrete block plant of the sheriff's honor farm. Mr. Mitchum said he hoped the other prisoners wouldn't resent him.

On the other hand, Robert, maybe it would serve 'em right. There ought to be some drawbacks to prison life, and a little mild resentment of one's associates seems to be about all there is left. Used to be



the mean old wardens would put you on the rock pile making little ones out of big ones by strong arm methods; now they set you up in a nice, clean block plant, with plenty of modern machinery to make big ones out of little ones, Verily, the old order changeth.

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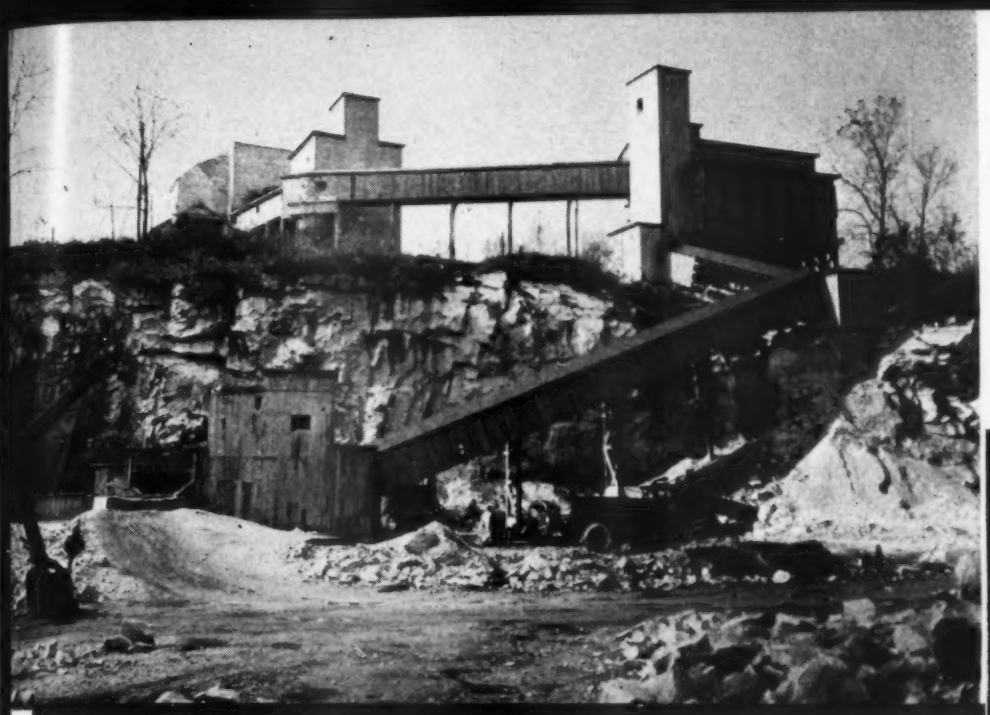


View of plant, showing crusher house and enclosed conveyors which feed the two pulverizing plants perched on the rim of the quarry.

One of the three ring-roll mills which operate in closed circuit with vibrating screens.

Mechanization Program Cuts Costs For New England Agstone Producer

By William M. Avery

Modern machinery reduces quarry force at D. U. Smith Plant from 60 to 12 men

another ON THE SPOT report

AN EXTENSIVE mechanization program carried out in the quarry and plant of D. U. Smith & Bro., Ashley Falls, Mass., has yielded an outstanding reduction in total labor, and at the same time has effected a notable increase in overall production. Although the company's main product is agricultural limestone, it produces a versatile line of materials including fluxing stone, marble aggregate, poultry grit, terrazzo, stucco dash and marble chips.

As recently as 1941 hand breaking and hand loading in the quarry alone required a working force of about 60 men. The high manpower requirement, coupled with the freezing of wages during World War II, all but put the company out of business. This experience, coupled with the trend toward higher wages and the increasingly competitive conditions within the agstone industry, sounded the death knell of hand operations in the quarry. Upon completion of a broad mechanization program launched shortly after the close of the war, the total quarry force was reduced from 60 men to an even dozen. This dramatic curtailment was accomplished with no loss in output. Improvements carried out simultaneously in the plant proper effected a

15-t.p.h. increase in pulverizing capacity, bringing the total to approximately 40 t.p.h. In the main, however, the entire program was aimed at manpower reduction.

The stone in the deposit at Ashley Falls is a true, exceptionally hard dolomite. It is overlain by rather heavy and rough overburden which is stripped with a P & H gasoline-powered shovel. In earlier operations there was a serious secondary blasting problem, but considerable improvement has been brought about by the use of du Pont delay caps, and officials estimate that secondary shooting has been reduced by at least 50 percent. Less back break, reduced throw, and vibration are other benefits which have been noted. Two-row shots, which were formerly avoided because of the proximity of the quarry to the village of Ashley Falls, are now taken as a matter of course.

The quarry is worked on a benching system in 20- to 22-ft. lifts, and wagon drills are used for all primary drilling. Air for operating wagon drills and jackhammers is supplied by an Ingersoll-Rand 310-c.f.m. portable compressor. When the working face is changed so that blasting is no longer toward the plant, it is planned to use snake holes in combination with a double row of vertical holes to effect still further improvements in breakage. It is hoped that this procedure will curtail the rather large amount of secondary shooting which is still required after top blasts. The present depth of the quarry is around 60 ft.

Under the former method of operation no actual processing of the stone was done in the quarry. After breaking the stone into man-size pieces, it was hand loaded into small quarry cars which were hauled by cable up an incline to the plant proper. There it was reduced to mill size in a 10- by 20-in. jaw crusher and a Sturtevant reduction crusher. As part of the mechanization program, new primary and secondary crushers were located in the quarry, so that now only mill-size material is fed to the plant.

Loading at the face is now done with two ⅞-cu. yd. Erie steam shovels. Mack end-dump trucks haul the stone across the quarry in loads ranging from 6 to 8 tons. The trucks dump from a short ramp into a heavy-duty Cedarapids feeder, the latter discharging into a 24- by 36-in. Farrel-type jaw crusher set at 4 in. From the primary the stone drops by gravity into a 16-in. inclined Sturtevant bucket elevator which discharges into the secondary crusher—an Allis-Chalmers Type R 636 reduction unit. Here the entire flow is reduced to ¾ in. or under.

A system of 24-in. inclined conveyors, equipped with Bulldog belting and Robins troughing idlers, elevates the mill-size stone from the floor to the top of the quarry. The material drops into the boot of an enclosed 16-in. bucket elevator which can be used to feed either of the two pulverizing plants (designated as North and South) or a 1,000-ton timber storage bin. This stored mill-size stone, which can be fed back to the elevator by means of a belt conveyor, assures continuity of plant operations in the event of a shutdown in the quarry.

By means of dividing valves at the top of the elevator the flow of stone may be directed to the storage bin (by gravity), or to either of the pulverizing plants (by means of separate 18-in. belt conveyors). The pulverizing is done in three Sturtevant ring-roll mills—two No. 2 mills located in the South Plant, and one No. 1½ mill located in the North Plant. The mills are arranged in closed circuit with 3- by 6-ft. double-deck Sturtevant Moto-Vibro screens, of which there are five in the entire plant. Minus 20-mesh material is first scalped off as finished product, and the oversize goes to one of the 30-ton tanks located over each mill. High and low Bindicators in the feed tanks automatically start and stop the main feed conveyors.

The ring-roll mills have no internal screens to obstruct discharge. They depend entirely on an independent classifier (the Moto-Vibro screens in this installation) to size their output to the desired fineness. As rapidly as material becomes fine enough to pass the 20-mesh lower screen decks, it leaves the grinding circuits. Thus the rings and rolls are not cushioned by fines unable to escape, and the revolving rings are always covered by a thick layer of coarse stone particles mixed with tailings which have been returned from the screens.

Each plant is served by a 150-ton storage silo for finished products. The two silos, located between the plants, are fed from the screens by means of a system of screw conveyors, which can also be used to by-pass the silos and load materials directly into cars or trucks for bulk shipment. Material can be drawn out of either silo into a screw conveyor for feeding to the packing plant. In this case it is re-elevated and discharged into a 4-ton supply tank located over a 4-spout St. Regis bagging machine. The output of the bagging machine

This stone was dumped by trucks onto the 2- by 6-ft. reciprocating feeder which drops it into the jaw crusher below. Man shown sledges oversize stone to fit the jaws of the crusher.

Stone from the feeder falls into this small bin and then into the 18- by 36-in. jaw crusher shown. Discharge falls on a short length of belt conveyor (left).

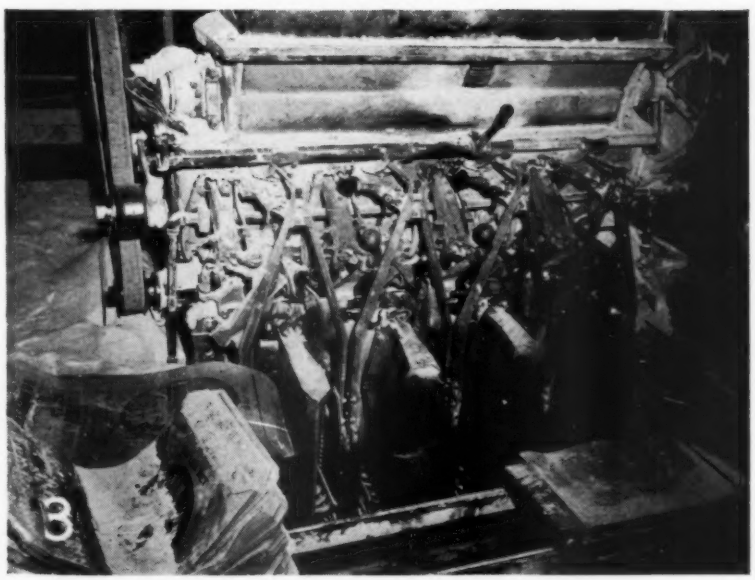
(approximately 40 t.p.h.) is usually loaded directly into cars or trucks by means of a belt conveyor. In the past the company has bagged as high as 65 percent of its total production, but this proportion is now dropping rapidly, with more and more shipments going out in bulk.

Although the present plant facilities were designed primarily for the production of agricultural limestone, the company still produces small quantities of fluxing stone, refractories, aggregates, chicken grit and similar products. As one time D. U. Smith supplied a major share of all such materials used in New England. These coarser products are kept entirely separate from agstone by producing them only in the No. 1½ Sturtevant mill located in the North Plant. This mill has a capacity of about 10 t.p.h. as compared with 15 t.p.h. on each of the No. 2 mills in which agstone is produced.

The company depends mainly on hired trucks for deliveries. It owns and operates one spreader truck (to take care of emergencies) in addition to 3 G.M.C. 15-ton trailers for bag deliveries. About 60 percent of output is shipped by truck and the remainder by rail. Most shipments are consigned to points in Massachusetts, Connecticut and eastern New York, but some go as far as Vermont and northern New Hampshire.

Electric power for the pulverizing plants and other above-grade installations is purchased from the South Berkshire Power & Electric Co. Unable to purchase the additional power required to mechanize

(*Continued on page* 98)



1. This conveyor carries the rough crushed material out of the quarry and to the main crushing plant. Discharge of this conveyor is at a transfer house and onto another conveyor running at right angles.

2. One of the five double-deck 3- by 6-ft. vibrating screens. For agstone production the decks are fitted with ¼-in. and 20-mesh cloth.

3. About 40 t.p.h. of finished products can be bagged with this 4-spout bagging machine.

4. Dave Smith, son of D. U. Smith, inspects the 400-kw. a.-c. generator which supplies a part of the electric power for the plant. The small generator is the exciter.

Kelley Island Builds New Gas-Fired Shaft Kiln Plant at White Rock, Ohio

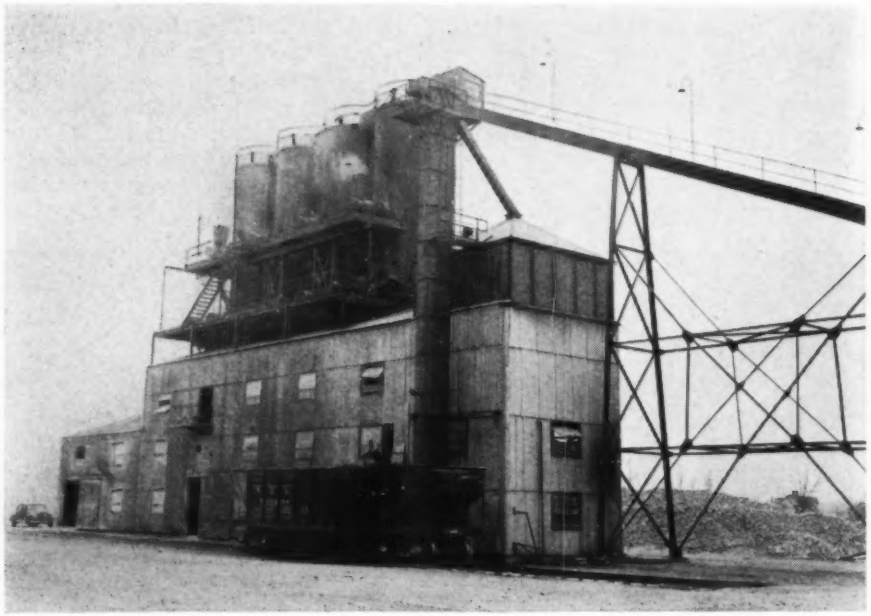
another ON THE SPOT report

AN entirely new vertical-kiln lime plant, incorporating four Azbe-design forced-draft center burner kilns, has been in full operation for a number of months at the White Rock, Ohio, plant of the Kelley Island Lime & Transport Co. Undertaken primarily with a

By WILLIAM M. AVERY

view to increasing production, the project has enabled the company to retire 21 old shaft kilns which had become marginal producers due to low output, poor fuel efficiency, and relatively high labor requirements. Out of a total of some 40 shaft kilns located at the White Rock plant, only 11 remain in service.

Only very minor changes were required in the primary crushing setup at White Rock to produce the 2½- to 5-in. stone with which the new kilns are charged, and quarry practice has not been affected in any way. The Edison-Grant 5-ft. roll crusher is now operated so as to produce as much 2½- to 5-in. stone as possible for the Azbe kilns. This size is taken out by means of a trommel screen and stored in bins adjacent to the primary crushing plant. Approximately 100 tons per day of plus 6-in. stone produced by the primary is stockpiled for later feeding to the old shaft kilns, while any excess in the 2½- to 5-in. bracket is reduced to 2-in. in a Symons 3-ft. standard cone crusher and routed to a fine screening plant.



• A general view of Kelley Island Lime & Transport Company's new shaft kiln plant at White Rock, Ohio.

Stone is hauled from the bins to the new kiln in an Autocar diesel end-dump truck in loads ranging from 12 to 15 tons. After a haul of approximately 350 ft. it is dumped into a ground-level hopper from which a Syntron vibrating feeder moves the material into an 18-in. inclined bucket elevator. The latter discharges into a 550-ton overhead steel bin which straddles the charging car rails.

Loading of the charging car is handled entirely from a control station located on the charging platform, although there are auxiliary controls at ground level which can be used in case visibility is too poor. When the charging car is in place under the bin the operator above presses a button which starts up a vibrating feeder in the bottom of the bin. The feeder has grizzly bars which take out any minus 1-in. stone before it reaches the car. These fines are routed to the fine screening plant.

The car is pulled up an inclined trestle to the charging level by means of a cable. The operator having previously set a selector pin at the kiln which he desires to charge, the car automatically stops at that kiln, opening the kiln doors in the last few feet of travel, and dumps its load. This is accomplished by an ingenious arrangement of cables and levers utilizing the forward motion of the car to open the kiln doors, and the opening of the doors in turn trip the car dump lever. The only manual operation in the entire cycle is closing and latching the car doors.

The four kilns, each measuring 14 ft. O.D. (10½ ft. I.D.) by 70 ft. in height, are identical. Each has

• The 550-ton steel bin from which the charging car is fed, as seen from the top of the kilns.

its own Buffalo-Forge forced-draft fan located on a common platform some 17 ft. below the top of the kilns. A tube approximately 3 ft. in diameter, with ports in the bottom, extends from wall to wall of each kiln at this level, pulling the draft through the bottom of the kiln.

There are also separate fans located below the draft fans for pulling CO_2 either from the top stacks or from side off-takes. Normally CO_2 is taken from the top stacks, but the side off-takes are used occasionally to balance the heat in the kilns. This is accomplished by means of dampers which make it possible to draw more (or less) from one side of a particular kiln than from the other. CO_2 is re-fed to the kilns intermittently in accordance with the head fireman's judgment of conditions prevailing.

Fuel for the kilns comes from a No. 10 Wellman gas producer which has a capacity of 1 to 3 tons of coal per hour. This unit is equipped with a mechanical double-bell fuel feeder, one bell of which is always closed to prevent loss of pressure. Draft is provided by means of a blast fan, CO_2 being mixed with the air just before it enters the bottom of the producer.

Gas leaves the producer at a temperature of around 1300 deg. F. and passes into a dust collector in which fly ash is removed. From the collector it enters a long, 48-in.-diameter main which has leads into each of the four kilns. There is a soot leg at each kiln connecting with a hopper in which soot, carbon, and fly ash collect when the gas mains are blown out. The practice is to shut down for this purpose for 2 or 3 hours once every two weeks. Most of the material collected at the bottom of the soot legs burns off when the air reaches it.

• A close-up of the charging car in loading position. The vibrating feeder, controlled from above, delivers stone to the car.

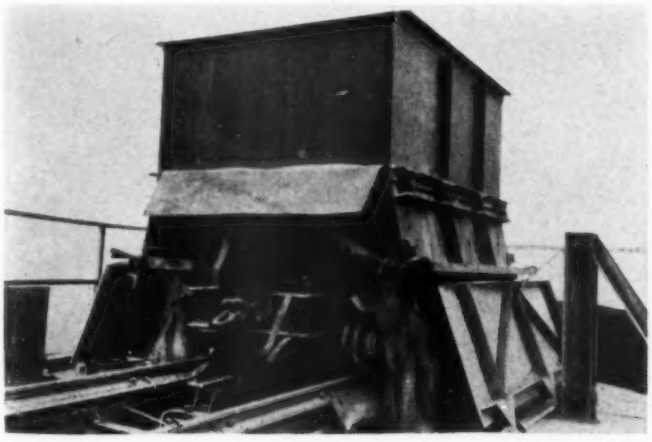
At each kiln gas passes from the main into a stepped gas tunnel, and thence into the center burner gas duct. The amount is regulated by means of rack-and-pinion valves. Some CO_2 is mixed with CO right at the tunnels to temper the flame, and air may also be fed at this point if desired. The gas ducts pass clear through the kilns. Each has 22 ports (11 to a side) measuring 4 in. wide by 6 in. high.

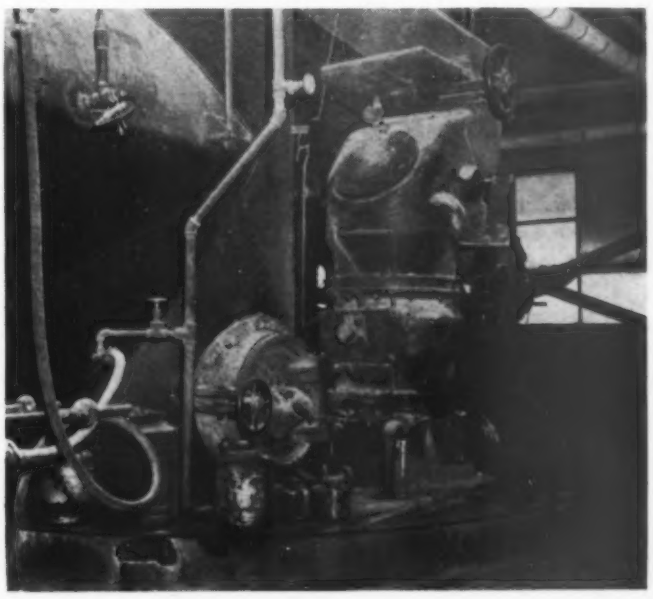
There are, of course, separate draft instruments and heat charts for each kiln. These and the control dampers for the fans are located on the fire floor.

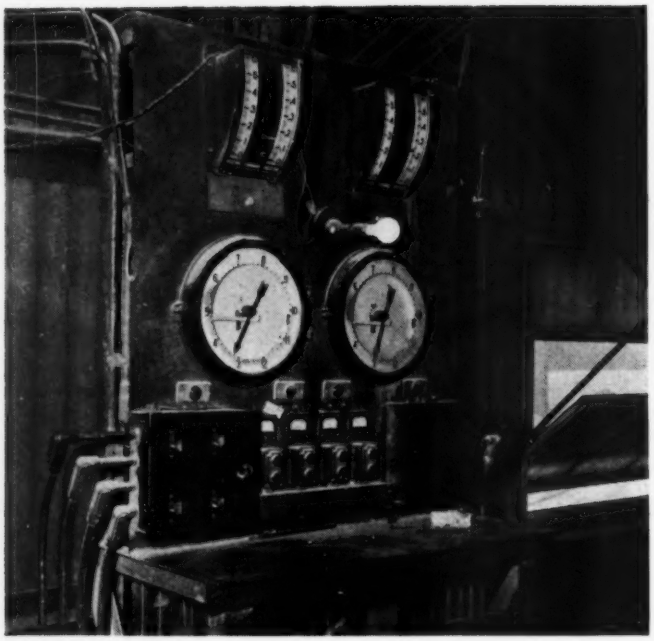
The coolers are sectioned and there are four independent draw points on each kiln, each served by a Syntron vibrating feeder. With four draw gates it is possible for the fireman to draw as much or as little as desired from the various sections, balancing the kilns from hour to hour as required. There is a 4-compartment draw hopper under each kiln which enables the drawman to gauge the amount of lime taken from each section of the cooler; each compartment holds about three-fourths of a ton, and a particular draw may vary from a fourth of a hopper to a full hopper, depending on the conditions prevailing at the time.

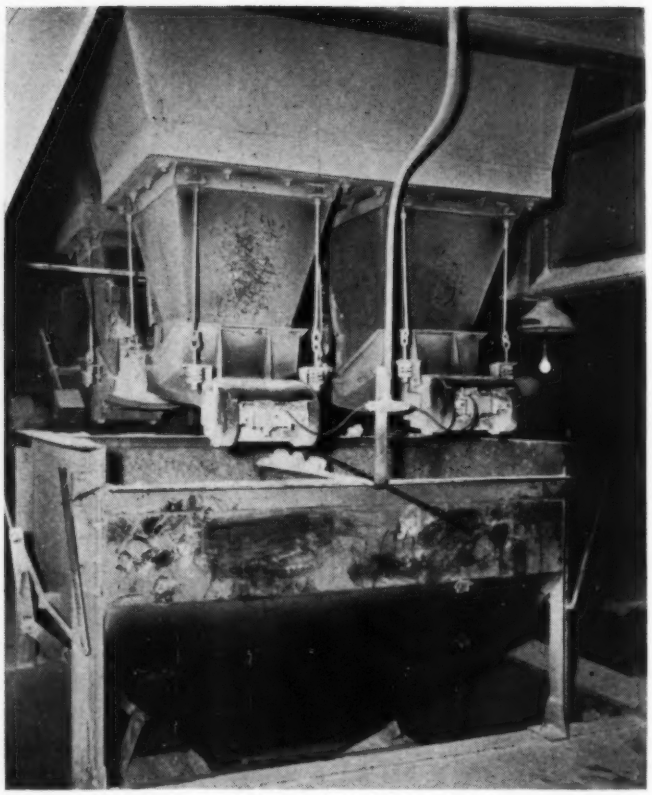
To permit satisfactory trimming on every draw, the kilns are well supplied with strategically located poke holes and platforms. Despite

• Below: A pin having previously been set at the kiln to be charged, the car stops automatically, opening the kiln doors in the last few feet of travel, and dumps its load.
• Right: A view of the double-bell fuel feeder on the gas producer. Capacity ranges from 1 to 3 tons of coal per hour, depending on the fuel in use and the number of kilns operating.









• Separate draft instruments and heat charts for each kiln are located on the fire floor.
• Right: There are four independent draw points under each kiln. Vibrating feeders discharge the lime into 4-compartment hoppers which enable the drawman to gauge the amount taken from each section of the coolers.

the frequency with which the kilns are drawn, the lime usually hangs long enough to permit trimming.

When a draw is completed (average time about 4 minutes per kiln), a hinged chute at the bottom of the draw hopper is lowered until the bottom rests on a 30-in. pan conveyor which extends under all four of the kilns. The chute is jarred just enough by the movement of the conveyor pans to provide a steady even flow of lime onto the conveyor. The lime is elevated and discharged into a steel hopper from which trucks are loaded to haul the material to a mill located some distance from the kilns. Ultimately the company contemplates building a new mill and hydrate plant to be operated in conjunction with the new kilns.

A complete 24-hour operation of the new lime plant requires a crew of 17 men plus a foreman. Each shift requires a truck driver, a drawman, two kiln firemen and one fireman for the gas producer. In addition, on the day shift alone there is a hoist operator and an elevator operator. Experience to date indicates that this crew is required regardless of the number of kilns in operation. So far an average of only three kilns has been maintained, but the company expects henceforth to operate all four.

Performance so far indicates that two of the new kilns produce as much, or more, lime as ten of the old shaft kilns which were retired from operation, or roughly 100 tons in 24 hours (*i.e.*, 50 tons per kiln). Additional experience may well improve this showing.

From home offices located in Cleveland, Kelley Island operates a total of eleven plants—6 in actual production and 5 in distribution. Producing plants are located at Rockport, Mich., Buffalo, N. Y., and Clay Center, Gibsonburg, Marblehead and White Rock, Ohio. From these plants flow as diversified a line of limestone products as can be found anywhere in the industry. A partial list includes lump, pebble, ground and hydrated lime in high calcium, high magnesium and intermediate grades; refractory-burned dolomite; fluxing stone for open hearth, blast furnace and foundry use; crushed stone for construction and general industrial purposes; ground and pulverized limestone for agricultural, chemical and industrial purposes; and asphalt dust, raw dolomite and rip-rap stone.

George L. Clezie is superintendent of the plants at White Rock and Clay Center, and Charles Smith is foreman of the new lime plant.

• The draw hoppers discharge on a pan conveyor which serves all four kilns. Lime is elevated and discharged into a bin from which the trucks are loaded for the short haul to the mill.

Rock and Mineral Sources Of Nutrient Trace Elements

Part II

Zinc (Zn)

another P and Q exclusive

ZINC is not particularly abundant from an overall view of the earth's crust, but fortunately it occurs in numerous local ore concentrations so that its minerals are not rare. Besides the ore minerals of zinc, other sources of it for trace elements are smelter refuse, zinc scrap, and chemical products.

By W. D. KELLER
Professor of Geology, University of Missouri

Ore minerals of zinc are sphalerite, sometimes called "jack," ZnS, (67 percent zinc), smithsonite, $ZnCO_3$ (52 percent Zn), willemite, Zn_2SiO_4 (58.8 percent Zn), hemimorphite, H_2ZnSiO_5 (54 percent Zn), zincite, ZnO (80 percent Zn), and franklinite, which was also listed under manganese. Under geological conditions the zinc minerals usually react readily with ground water, and zinc is released in dilute solution. It should therefore soon become available to plants.

Zinc is mined in at least 21 states in this country, notably Oklahoma, Kansas, Montana, Wisconsin, New Jersey, New York and Virginia. Mills and smelters are distributed widely so that zinc ores and concentrates should be easily available for additions to soil supplements.

Zinc is important in tissue respiration, action of the pancreas, and regulation of development and growth. Man obtains more or less zinc in his diet from what has been dissolved from solder in "tin cans."

Nickel (Ni)

Although nickel is estimated to be something like four times as abundant as zinc in the earth's crust, its ore deposits are less widely distributed. Nickel is commonly associated with iron compounds in mineral form, and also is recovered as a by-product from certain copper ores.

Minerals which produce nickel are nickeliferous pyrrhotite, and pentlandite, both being sudphides of iron and nickel; niccolite and chloanthite, both arseenides of nickel; and garnierite which is a weathered nickel and magnesium silicate. Certain olivine, serpentine, and weathered rock residues are sub-ore grade, but might be potential lean sources of nickel as a micro-nutrient.

Photo by Courtesy of Pacific Coast Borax Co.

• The historic 20-mule team which hauled boron minerals out of the desert many years ago.

Canada leads the world in nickel production. In the United States nickel ores are mined, or occur, in Missouri, Pennsylvania, Washington and Montana.

Nickel functions as a micro-nutrient by enhancing the effect of cobalt or by possibly substituting for it.

Molybdenum (Mo)

Molybdenum deficiencies have been recognized in New Zealand, and recent research has shown that very small amounts of it promote nitrate assimilation in plant.

Molybdenum is not abundant in the earth's crust, but the United States has reserves that should last for several hundred years at the present rate of consumption. The chief ore mineral is molybdenite MoS_2 (60 percent molybdenum), but molybdenum also occurs in wulfenite, $PbMoO_4$, and as a by-product of some copper mines.

The leading deposit of molybdenite is at Climax, Colorado, with lesser production coming from Arizona, California, New Mexico, Nevada, Utah, and North Carolina. Montana holds large reserves of ore running less than 0.25 percent molybdenum.

Boron (B)

Boron is abundantly available in borax, $Na_2B_4O_7.10H_2O$, and in a related group of other sodium and calcium borates. Most of them contain more or less water of crystallization which is driven off by heating (calcining), whereby the boron content is raised to about 15 percent, and B_2O_3 to about 65 percent to 69 percent. The commercial borates are typically highly soluble, possibly too soluble for optimum soil supplement purposes.

Borate production in the United States is centered around the Mojave Desert region in California and Nevada. Other boron-containing minerals, like tourmaline, datolite, danburite, and axinite are believed to be not practical scources of boron in competition with crude borax and borates.

Boron deficiency is manifested by acute symptoms of rotting, cracking, and discoloration in fruit, vegetables, and alfalfa.

Iodine (I)

Although plants seem to grow without appreciable iodine in the soil, animals and man require some iodine in their food or drink. From our present understanding of the problem, it seems easiest to supply iodine in micro-quantities as iodized food (like salt), or in feed supplements.

Current domestic sources of iodine are oil well brines, particularly in California and Louisiana. The bulk of the world's iodine has come as a by-product from the nitrate deposits of Chile. The ash from burned kelp, which asborbs iodine from the ocean water, is another possible source of it.

Fluorine (F)

Fluorine is essential in the hardening of bones and teeth, but may become highly toxic and a cumulative poison under excessive or adverse application or exposure.

Therefore, extreme caution must be observed in the use of fluorine compounds.

Fluorine occurs in fluorite, CaF_2, and in certain calcium fluo-phosphates. Fluorite is mined in the Kentucky-Illinois district and in almost every state west of the front range of the Rocky Mountans.

Chromium (Cr)

The importance of chromium as a micro-nutrient has not been thoroughly investigated although it was found beneficial for the growth of cucumbers.

The chief ore of chromium is chromite, $FeCr_2O_4$, a dark, hard, relatively insoluble mineral. Probably a crude chromium salt processed by the chemical industry will be the most practical source of chromium for soil supplements.

Chromium ores are definitely scarce and strategic in the United States. Montana, California, and Oregon have produced some chromium, but leading world production comes from the U.S.S.R., Turkey, South Africa, Southern Rhodesia, Greece, and other parts of the Balkans.

Strontium (Sr)

Strontium has been listed by only a few investigators as a micro-nutrient for plants, but medical men have found it to have a beneficial effect on cerebral activity.

Two minerals are important sources of strontium: celestite, $SrSO_4$ (47.7 percent strontium), and strontianite, $SrCO_3$ (59.3 percent strontium). The latter is soluble in ground water, comparable to the $CaCO_3$ of limestone, and therefore crude strontianite is a logical source of strontium for soil and feed uses.

Strontianite has been produced commercially in Germany and England, and in Washington and California in the United States. Celestite is more abundant than strontianite in domestic deposits, being mined in California, Washington, Texas, Ohio, and Arizona.

Barium (Ba)

Barium occurs as barite, $BaSO_4$ (59 percent barium), and witherite, $BaCO_3$ (69.6 percent barium. As in the case of strontium, witherite, the carbonate of Barium, is more readily soluble in ground water than is the sulphate, and logically would be the preferred source.

The chief production of witherite comes from England but barite is abundantly produced domestically in Arkansas, Missouri, the south Appalachian states, California, Arizona, Nevada, and elsewhere.

Lithium (Li)

Lithium is used medicinally, but its place as a micronutrient in the conventional sense is not completely defined.

The chief mineral source of lithium is spodumene, $LiAl(SiO_3)_2$ (furnishes commercially about 3 percent lithium), but amblygonite, lepidolite, triphylite, lithiophilite, petalite, and zinnwaldite (content of lithium within the group varies) are occasionally mined for the same purpose. The brine from Searles Lake, California, supplies lithium salts.

South Dakota, California, and North Carolina are the states accounting for the chief domestic production of lithium.

Sulphur (S)

Elemental sulphur in small quantities has been reported to have beneficial effects to organisms under certain specific conditions.

Very large-scale domestic production of sulphur comes from the salt-sulphur domes bordering the Gulf Coast, but other localities which have been operated intermittently or on a smaller scale are in California, Nevada, Utah, Colorado, Wyoming, and New Mexico.

Bismuth, Tin, Silver, and Magnesium

Bismuth (Bi), tin (Sn), and silver (Ag) are used by the medical profession as trace element diet supplements, and it is not improbable that they will be found by research to be necessary as conventional agricultural trace elements. Bismuth occurs in the mineral bismuthinite (Bi_2S_3) and as a by-product from lead, copper, cobalt, zinc, and silver mines. The Utah and Montana copper and lead ores supply domestic bismuth.

Tin (Sn) is almost entirely imported from Malay and Bolivia. Cassiterite, SnO_2, is the chief tin ore. Man may obtain sufficient (or too much according to some tests) tin from food which has dissolved it from the tin plating of "tin cans."

Silver (Ag) is obtainable from the precious metal ores. Considerable silver is wasted by the failure to recover it from hypo solutions used in fixing photographic films and papers. X-ray film laboratories of hospitals and clinics also dissolve significant quantities of silver which is available in the spent hypo solution.

Magnesium (Mg) is ordinarily thought of as a major nutritional mineral element which is added to the soil as dolomite, $CaMg(CO_3)_2$. However, when magnesium functions as an infinitesimally small necessary component of the green chlorophyll in plants, it behaves like a nutrient trace element. Other minerals which contain magnesium are olivine, $(MgFe)_2SiO_4$, magnesite, $MgCO_3$, talc and montmorillonite clays. The green and dark colored igneous rocks are usually rich in magnesium.

Summary

The nutrient trace elements needed by soils, or as mineral foods or nutritional sprays may be obtained from bulk rock, concentrated ore minerals, furnace slags, chemical by-products, or from mineralized waters. Currently used agricultural stone may contain some trace elements, but others can be added to fortify the stone or to round it out as a complete mineral nutrient supplement.

The technical sources of the trace elements have been described. The most profitable source for each producer or consumer will depend upon location, transportation factors, and needs peculiar to the individual case. It is recommended that state geological surveys or bureaus of mines be consulted for local rock and mineral occurrences, and that chemical and furnace by-products be considered when the individual surveys his particular problem of a source for nutrient trace elements.

References

The Composition of the Earth's Crust, F. W. Clarke and H. S. Washington, U. S. Geological Survey Paper No. 127.

Spectrochemical Analysis of Rocks and Minerals, Esther W. Claffey, American Journal of Science, January, 1947.

Minerals In World Affairs, T. S. Lovering, Prentice-Hall, Pub.

Mechanization Program

(*From page* 93)

the quarry, the company generates its own with a 175-hp. Ingersoll-Rand diesel engine driving a 400-kw. Crocker-Wheeler a.-c. generator. The latter is driven by a flat belt; it drives its own exciter through a V-belt.

D. U. Smith & Bro. has been in business at Ashley Falls since 1912. Originally the company operated a large marble finishing mill. In 1920 the first crushing facilities were installed, and several years later agricultural limestone was added to the line of products.

The partnership consists of D. U. Smith and his brother F. A. Smith and their sons—D. U. Smith Jr., David A. Smith (sons of D. U. Smith), F. A. Smith Jr. and Harold F. Smith (sons of F. A. Smith). The plant at Ashley Falls is under direct supervision of David A. Smith and F. A. Smith Jr.

Some Observations on the European Lime and Cement Industries

By WOLF G. BAUER
Consulting Engineer

another ON THE SPOT report

DURING a recent three-months' trip to various European clients, the writer had fleeting opportunities to inspect a number of lime and cement plants in Holland, Germany, Switzerland, and Italy, as well as to talk with association heads, operators, and equipment manufacturers in these countries. It should be understood, however, that this discussion is not the outcome of a systematic study and collection of statistical data, but simply personal impressions carried away by the writer regarding the present technological and economic status of lime and cement manufacture in the regions visited, which may be of general interest to PIT AND QUARRY readers. Thus, a general picture is presented without indicating specific plants or firms, in order to avoid any possible embarrassment or ill-feelings created if differences or shortcomings are pointed out. In later articles specific operations of some plants will be discussed and illustrated.

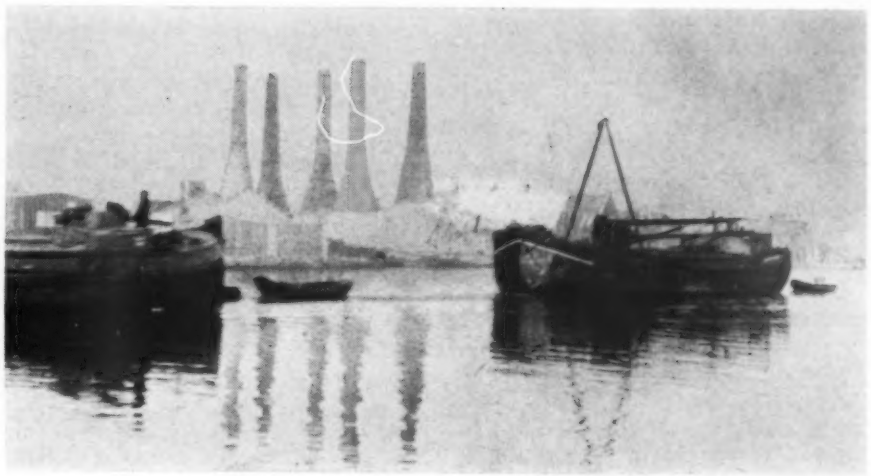


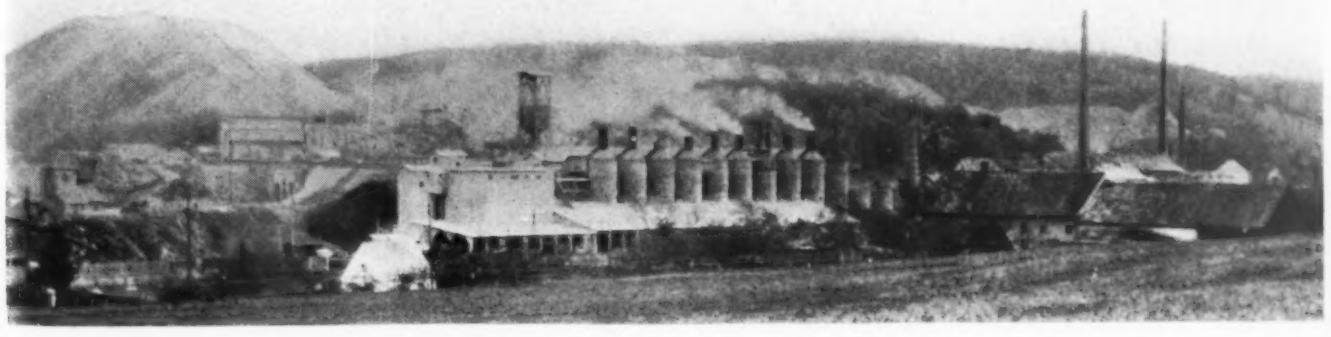
Fig. 1. A typical Dutch lime plant near Rotterdam, showing characteristic chimney-like kilns.

INTRODUCTION

Naturally, in first being confronted with many practices that are unfamiliar, one is apt to draw hasty conclusions as to their merits on a comparison basis with American methods and equipment. This is especially a danger when one has only limited time to make such inspections. Often additional linguistic restrictions inhibit one's thoroughness, if not ardor, in searching out specific information. However, the writer's familiarity with the German language aided greatly in these visits, as it was found that aside from Germany and Switzerland, most engineers and operators in Holland and Italy converse in that language quite fluently, whereas English was not always a possible medium. All through these visits it became evident that our technical advances and practices were being read and studied avidly through the pages of PIT & QUARRY and other publications in every country visited. Suddenly to come upon the familiar covers of these American journals on the desks of plant executives of a cement plant in the plains of northern Italy, or in small lime plants tucked away in some deep narrow valley of the Swiss Alps, gave one a distinct feeling of pride as well as professional kinship. No matter what the political situation may be, the technical problems are similar everywhere, forming a free-and-easy basis of getting acquainted and interested in each other's problems.

In order to understand and compare the technical status of the industry abroad, the reader must remember that the war years considerably slowed down advances in techniques and equipment. Little as we may realize it here, the stoppage of German machinery export since 1938, as well as the vacuum created by destruction of German industry in the period following, have created a situation which has put American know-how and interim progress in a favorable, if not favored, position. Nevertheless, Europe is best served by Europe, for, with our seeming reluctance for importing, and the consequent shortage of much-sought dollars everywhere, it is certainly not to our interest to export machinery and equipment for these industries of the type which can be built overseas. In talking with German manufacturers of heavy cement mill

Fig. 2. A view of a German lime plant. In the center is a battery of small high-capacity mixed-feed kilns; at the right are the Hoffman ring-type kilns with their tall stacks.



machinery, I learned that plants and shops are being dug out and put into partial operation, and that some machinery is being exported to neighbor countries. However, until any of the relatively low-priced modern German equipment is again available to the European buyers, present plants are being built at higher costs locally, or from supplier countries such as Czechoslovakia, Switzerland, Belgium or Scandinavian countries.

To illustrate the present status best, one might say that it was with a truly international spirit that the writer had occasion to start up a pan feeder in a Dutch plant recently, the Netherlands-built switch starting a U.S. motor to drive a Belgian feeder through a Swiss variable-speed transmission. Such mechanical linkages are commonplace today, and one wonders why such ties and interdependencies have not done more to remove national barriers.

HOLLAND

The Netherlands, although rather limited in natural resources and minerals, do have available most of the necessary raw materials for cement and lime manufacture, gypsum being the only missing mineral. Comparatively extensive beds of marl, as well as some limestone, are found in the elevated and hilly southwestern corner of the country and there, in the Maastricht area, the one and only cement plant operates. Despite the large capacity of this multi-rotary kiln plant, the Dutch must still import over one-half of their cement from Belgium and elsewhere. Lime is pretty well supplied from local sources, the most significant being in the form of large beds of sea shells dredged off the Channel coast.

Lime Manufacture Almost as typical as the windmills, the Dutch lime kilns, with their characteristically tapering brick walls and chimney-like appearance, locate the small lime plants throughout the flat land or "polders" near the coast. These plants are extremely simple, and follow a most singular pattern, both as to equipment arrangement and technique of manufacture. Figure 1 shows a typical plant near Rotterdam.

The sea shells are rather small, both light and dark in color, and consist of a great variety of species. They vary in size from ½ to 3 in. in cross-section, and are quite thin. They are barged up the canals and rivers from the coast to the plants, and there transferred by clamshell bucket to storage piles alongside the kilns. Coke is similarly transported, its size varying from plant to plant, generally being from pea to nut size. In the plants visited coke and coal were mixed before introduction to the kilns, one plant employing the questionable procedure of dumping coal and shells periodically on top of each other on storage piles, and then scraping up across the pile with buckets suspended from cables leading directly to the kiln charging chute. Another producer used adjacent coke and shell piles with intervening scraper chain in a tunnel, the two raw materials being allowed to flow by gravity in regulated streams onto this chain. The chain then discharged to a paddle mixer, which emptied into a skip hoist to the kiln.

As can be seen in the photograph, the kilns for burning these shells were invariably built of brick throughout, starting with a wide base of anywhere from 10 to 15 ft. in diameter outside, and tapering to 5 ft. or so in the stack section 15 to 50 ft. above ground level. Some kilns supported the charge on grates, while others continued three or more sloping chutes leading to the outside around the kiln, the material resting on a brick or concrete base. Some attempt was made to increase production by blowing air under the grates of some kilns. In others, the natural draft pulled combustion air into a central head or column extending about half-way up through the lime. In all instances, most of the burning and calcining took place in the upper half of the total charge, and cooling was more by conduction and radiation losses than by any preheating of combustion air. This is especially so because the fragility of the shells after burning causes considerable breakage and tightness of the lime bed.

Production is anywhere from 5 to 20 tons per kiln, most plants operating their kilns only on a 16-hour basis. Fuel ratios are, however, quite good, the operators claiming coke consumption of less than 15 percent. Due to the thinness of the shells, calcining time must be a matter of minutes, rather than hours. The lime contained both hard and soft-burned shells, the unburned portion probably running over .5 percent.

The lime is removed periodically with wheelbarrows and dumped on slaking floors, as a large portion is sold as hydrate. Slaking is done by hand, a thick bed of shell lime being sprinkled with water from a hose or bucket, and then mixed with shovels. The steaming heaps are then allowed to finish hydration for about 24 hours. In some plants this lime is then elevated and screened, after which it is sacked in open-mouth bags. Specifications as to fineness, CaO content, plasticity, etc., do not exist for most uses. Quicklime is crushed in jaw or hammer mill crushers and screened. The quicklime cannot be sorted for unburned fractions, and is sold for chemical trades such as carbide, while the hydrated lime is used for construction purposes. The plants visited represented about 50 percent of the Dutch production, and were by far the least progressive of any seen on the Continent. Holland produces approximately 5000 tons of lime from stone, 8000 tons from marl, 45,000 tons from shells, and 10,000 tons from carbide waste. The potential need is well over 100,000 tons annually.

GERMANY

Only a few German lime and cement plants in the U. S. Zone were visited, and some of the information presented here was obtained indirectly through interviews with various German operators, as well as from published findings of British and American investigating commissions. The German cement and lime industries have always in the past enjoyed a well-organized national association. Through the former *Tonindustrie Zeitung* published in Berlin (now discontinued and replaced by *Zement-Kalk-Gips* published by Rudolf Schirmer in Wiesbaden) the technical advances and problems of these industries have found a well-presented exchange medium in these pages. It is especially astounding that even today, with the paper shortage and the necessity to print among the ruins and makeshift workshops, so many of these technical journals dealing with manufacturing and product uses have reappeared. Both lime and cement are desperately needed in reconstruction. Although slowly at first, basic chemical and metallurgical industries will also require an increasing share of lime in the coming years. As in our own country, some of the large chemical lime users also manufacture their own lime.

As to cement plants, the writer was particularly interested in the technical features and reasons for existence of high-capacity mechan-

Fig. 3. A rather modern lime plant at Regensburg, Germany, which has high-capacity mixed-feed shaft kilns, and also the Hoffman type.

ically-operated shaft kilns. In a later article some of the features of automatic portland cement shaft kiln operation may be discussed. Suffice it to indicate here that these kilns are not always considered on their way out, but are being continually improved. Their high fuel efficiency makes them particularly attractive at the present time in Europe for standard portlands. Rotary kiln cement plants show little basic deviation from standard U.S. practice, except some variations in machinery design, the absence of closed-circuit clinker grinding, and the use of indirect pulverized coal firing in the rotary plants visited.

Lime Manufacture Several types of limestone exist in Germany, the purest being located in the Jura Mountain range, source of the famous white, pure "Jurakalk". The plants and deposits visited were principally in lower Bavaria near Regensburg and the Danube valley and in upper Bavaria south of Munich on the fringe of the Alps. In one section a certain deposit contained hard and dense stone, while another located 30 miles away had exceedingly rotten and friable material. The two plants photographed in the Danube sector are typical of the larger operations. Figure 2 shows a battery of small but high-capacity mixed-feed kilns, as well as the Hoffman chamber or ring type with their tall brick stacks. The large hill in this picture in the left background shows the large waste pile of fine crumbly, contaminated stone from the quarry.

Figure 3 shows one of the more modern plants at Regensburg which uses several high-capacity mixed-feed shaft kilns, as well as the Hoffman type. This plant had a very modern and roomy plant building and machinery arrangement, but suffered from difficulties in replacing war-damaged machinery. The highly-mechanized hydrating department had been virtually demolished.

Figure 4 shows two modern-type forced-draft Seeger kilns in another plant. A number of these are being installed at the present time in various places. They produce about one-fourth of the lime in the western zone, while ring or chamber kilns account for less than one-third. Gas-fired kilns are not too frequent, and about 10 percent of the lime is burned in such kilns in Germany. Various mixed-feed types of mechanical draft and mechanical charging and discharging, as well as natural draft and hand-drawn kilns, make up the remainder. Rotary kilns are not employed for lime. Capacities vary from 50 to over 150 tons per day, with coke consumptions between 15 to 20 percent. The Hoffman kiln, despite its high labor cost, is still retained for soft-burned lump lime.

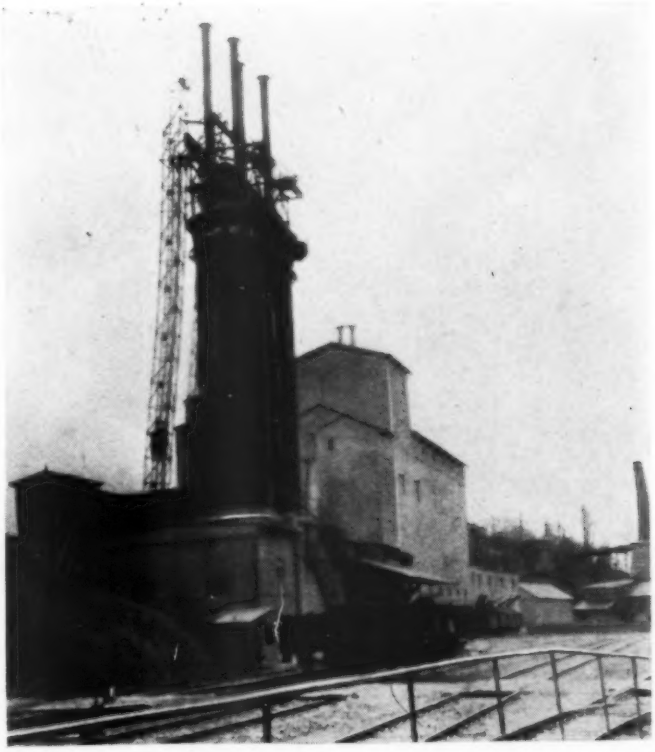


Fig. 4. Modern type of forced-draft Seeger kilns in another German lime plant.

Air drills, electric shovels, railway dump cars with steam locomotives and aerial trams are most generally in use in the quarries. Jaw and double-shaft hammermills are used for stone reduction. In general, crushing, washing, screening, and conveying differ little from our mechanized practices. The so-called "Torpedo" conveyor, somewhat similar to the "air-slide" type of conveyor, has been used in certain lime and cement plants for some time, not only in Germany, but also in other countries visited.

Aside from lump lime sold in bulk, hydrated and pulverized lime is also sold in both open-mouth and valve-type bags. Fine grinding is done in tube mills, hammermills and in bowl mills similar to the Raymond bowl mill. In such mills classification is done integrally with either fixed or rotating-type louvre air-separators built into the mill or the pneumatic conveying system. Mechanical air separators are also employed. Lime is hydrated in paddle-type machines, as well as in Clyde-type batch equipment. The preferred technique seems to dictate the use of large storage bins for finish-hydrating the hydrator product, the bin material being withdrawn, ground and air separated after a certain aging period. The whole of the aged product is sometimes ground and air-floated, while at other works the air separator tailings are ground separately for agricultural uses. Crushed lime is stored in batteries of concrete or

steel silos, special railway cars, similar to our detachable compartment cars, but smaller, being often employed for quick-lime shipment. German lime production has been quoted at 6 million tons annually; refractory dolomite at more than one million tons.

SWITZERLAND

Conditions in the Swiss lime and cement industry differ somewhat from those described so far. Although fuel is scarce and a costly item in every European country, this is especially so in Switzerland. There the writer saw American imported "coal" fired in rotary cement kilns, in which the water and ash content exceeded 50 percent, a fuel which would have been rejected by any American operator as unusable for firing any boiler, dryer or kiln. Not only were Swiss operators extracting the last heat unit from such high-priced "fuel" (and making high-strength portland), but in one location, hydraulic lime was burned in mixed-feed open-top shaft kilns with the waste cinders from railroad steam locomotives. If our manufacturers had to pay anywhere from $30 per ton of coal and up, the fine points of heat economy would no doubt have been studied and applied to the nth degree and to the exclusion of many other production cost items. Thus the Swiss have had to concentrate on, and have achieved some good results in this field.

Switzerland's democracy is older than ours. Due to a very tightly-integrated economy which is dependent primarily on import of raw materials, free enterprise as we know it resulted early in an unbalanced condition. Hence such industries as those of cement, lime, and gypsum are today not only bound together in their respective associations (E. G. Portland for cement, Gips Union for gypsum, and A. G. Kalk for lime) but are also completely controlled in matters of production or plant output, product distribution, and product prices. Within these limits, each plant expands, modernizes, repairs, and operates according to its means and best economy.

Pure and impure limestone is found in various sections of Switzerland. It is in the so-called lowlands of the northern region on the fringe of the Jura Range, however, that most cement plants are located. Of the 15 cement plants operating in that country, six produce hydraulic lime at the same location. Besides these, there are also a half-dozen other hydraulic lime plants, all within the fold of the E. G. Portland Association.

Practically all portland cement is made in rotary kilns of conventional designs, with integral heat-exchange improvements both for cooling and preheating. These developments, especially those worked out and applied by the technical bureau of Cementfabrik Holderbank-Wildegg A. G., will be discussed in a succeeding article.

Due to coal shortages, as well as of power and labor, cement production is far below requirements. An increase, however, from 293,000 tons in 1945 to nearly one million in 1947 has been achieved. Process plants are mostly dry, and both standard and high-early are produced. Norms and specifications are higher in Switzerland than those of other countries. The writer found the program and facilities of the E. G. Portland of a high standard and its testing and research station quite modern and complete. Since this testing station at Wildegg was written up in an earlier issue of PIT & QUARRY,* no further descriptions need be given here. Bi-monthly papers on the results of tests and research by this station are published by the association.

There are several separate small plants which produce lime only, some of this being high-calcium lime for chemical uses. Invariably mixed feed kilns firing coke or hard coal are employed. The kilns inspected were of masonry construction, with or without stacks. Stone was crushed to from about 5 in. down to 1 in. in size. Fuel ratios were reported as fairly good, *i. e.* 14 to 16 percent, cores averaging less than 4 percent. Mechanical hydrators are employed in some instances, as are also mechanical air separators for classification.

ITALY

Since the writer's business took him to the Milan area of northern Italy, only a small portion of that country's lime and cement plants were inspected at first hand. Egidio Campitelli of Milan, consulting engineer to the nonmetallic mineral industries there, acted as a most helpful guide and source of information.

Of the 100 Italian cement plants, 40 are rotary kiln plants; 60 employ vertical kilns. The former are predominantly dry process for reasons of fuel economy; there are 35 dry-process and 5 wet-process operations. The remaining 60 cement plants use both mechanically-and manually-operated shaft kilns, about 20 employing Dietz type kilns and the other 40 burning in various automatic shaft kilns. Cement produced in these shaft kilns, the writer was told, produced a cement which at an average showed about 10 percent lower strength than portland burned in rotary kilns.

The industry can produce about five to six million tons per year, including standard and high-early portland, hydraulic or natural, puzzolanic, and iron cements. The sold production in 1947 came to about three-and-one-half million tons. Shortages in coal and electric power, and also war damage, have had a distinct effect in lowering output.

Most Italian cement plants are small to medium in size, the largest having four rotary kilns. Plants inspected also employ Polysius equipment, using Lepol pre-heaters, and these have very good efficiencies and capacities. Mechanical shaft kilns of 8½-ft. diameter by 30-ft. height produced from 80 to 100 tons of clinker per day. German machinery predominates, although some Danish equipment is being installed. Coal grinding and drying is done by Loesche mills (similar to Raymond bowl mill) in the more modern plants, but, contrary to our practice, the ground coal is fed to the kilns from intermediate surge bins through venturi injectors and mechanical feeders. In one plant a very fine stream of water was continually playing on the lining close to the burner in order to inhibit ring formation. Air cushion type conveyors were seen in several plants. The porous media for these is made in hand molds at the plant, using closely-sized 40-mesh sand bonded with sodium silicate, tamped, dried, and allowed to harden, the plate thickness being about ¾ in. Conveyor chutes were inclined between 3 to 4 degrees from the horizontal. (Further discussion on Swiss and Italian cement plant practices will be presented in later issues.)

The situation is still unfavorable for new plants and the modernization of older ones. As Mr. Campitelli put it, the German manufacturers always came out with novelties and new wrinkles which set the "fashion", so to speak; and now that this supply is cut off, important innovations are being awaited from the United States. However, Italian en-

*See Phillip, Louis S.: *Technical Research Advisory Laboratory of the Swiss Cement Industry*, PIT AND QUARRY, August, 1948, page 81.

gineers and manufacturers are struggling to make themselves more independent of foreign equipment; this also holds true for the Swiss.

A number of cement plants also produce lime. Practically all lime is burned in shaft kilns, the total potential production being about one million tons for both white pure and hydraulic limes. The average hydrated-lime operation produces about 30 tons per day, hydrated lime being made both by hand and mechanical methods in about ten plants. The stone for hydraulic lime generally runs about 82 percent calcium carbonate. Hydraulic limes are widely used for mortar and stuccos, this product being made from either a natural limestone or an admixture of pure lime mixed with 20 percent cement clinker. In some cases the grinding and mixing of 80 percent limestone and 20 percent cement yields a product termed "hydraulic lime." Strength tests seem to form the basis of classifying these various calcareous cementing materials.

The discovery and present development of natural gas in northern Italy will do much to alleviate the coal shortages and high fuel costs in that region, and a number of cement plants, and possibly some lime plants, will be converted to the use of gas fuel.

SUMMARIZING OBSERVATIONS

Although the lime and cement production of European countries has been adversely affected by lack of labor, fuel, power, machinery, or capital, it is on the steady upswing; and rebuilding or new installations seem to be modern and efficient. One must learn to evaluate the designs and techniques of burning and processing equipment in Europe on the basis of each local condition. When one sees fully automatic dry-process portland cement shaft kilns erected in Germany or Italy, that is definitely not a backward step, considering the uses to which the cement is put, the economics of fuel and labor, and the size of most operations. Furthermore and on the whole, in inspecting lime burned in mixed-feed kilns, the writer cannot say that a 100-ton-a-day kiln using coke with a 7:1 fuel ratio does not yield a lime harder burned than that of many of our rotary kilns. On the other hand, such practices as the use of recirculated exhaust gases in mixed-feed kilns, venting of cooler blast air in various sections of the charge below the burning zone to control height of this zone thruout the kiln, the more efficient mixing of fuel and stone, and the technique of taking 8-hour CO_2 gas readings at various points above the hot zone, would all improve the quality and control of lime from these large mixed-feed shaft kilns. Furthermore, the use of mixed-feed calciners designed for stone sizes from ¾ in. down to sand size (20 to 5mm.) would allow many plants to utilize a larger portion of their stone for calcining.

Hydraulic lime is used to a large extent in Europe for building purposes. The value of lime in mortar, stucco, and concrete are well appreciated. Forced-draft high-capacity kilns have had their detrimental effects upon slaking properties and the plasticity of limes. This has been especially the case in Germany, where, for instance, an extensive sand-lime brick industry is dependent on soft-burned chamber kiln lime, and is therefore increasingly curtailed by a shortage of such lime, due to the trend to high-capacity kilns producing less suitable material. No doubt, the value of hot exhaust gas recirculation will eventually also find acceptance by European lime manufacturers.

All in all, in the few countries visited by the writer, it can be said that cement manufacture is not too far behind our own in technical development, *i. e.* if such development is not solely measured by the degree of mechanization. Laboratory and plant control, instrumentation, specifications, and product uniformity are probably more highly developed in the United States, while fuel efficiency has been given more attention in Europe. In the European lime industry it appears that burning control and lime hydrate processing techniques have still much room for improvement. Higher fuel efficiencies are entirely due to the use of mixed-feed kilns, but at some loss in quality of lime and control. Labor is cheaper, but mechanization is nevertheless considered and improved upon in all larger works.

As an item of possible interest to the more technically minded of our readers, the writer lists herewith the following European journals for the lime and cement industry which are available for study:

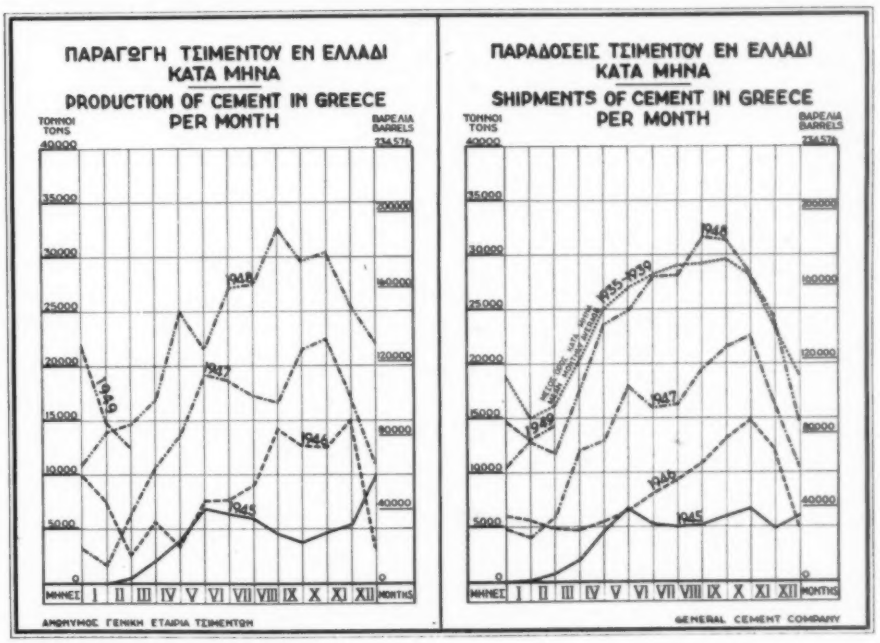
Cement & Lime Manufacture—Concrete Publications, Ltd., 14 Dartmouth Street, London S.W. 1, England.

Cement, Lime & Gravel—Salisbury Square House, London 4.C.4, England.

Betonstein Zeitung — Bauverlag G.m.b.H., Bingertstrasse 14, Wiesbaden, Germany, U. S. Zone.

Zement-Kalk-Gips — Bauverlag G.m.b.H. Bingertstrasse 14, Wiesbaden, Germany, U. S. Zone.

Cementbulletin—E. G. Portland, Zurich 1, Switzerland.



• These charts, reproduced through the courtesy of the General Cement Company, S. A., with plants at Piraeus and Volos, Greece, actually constitute a report of cement production and shipments through February, 1949.

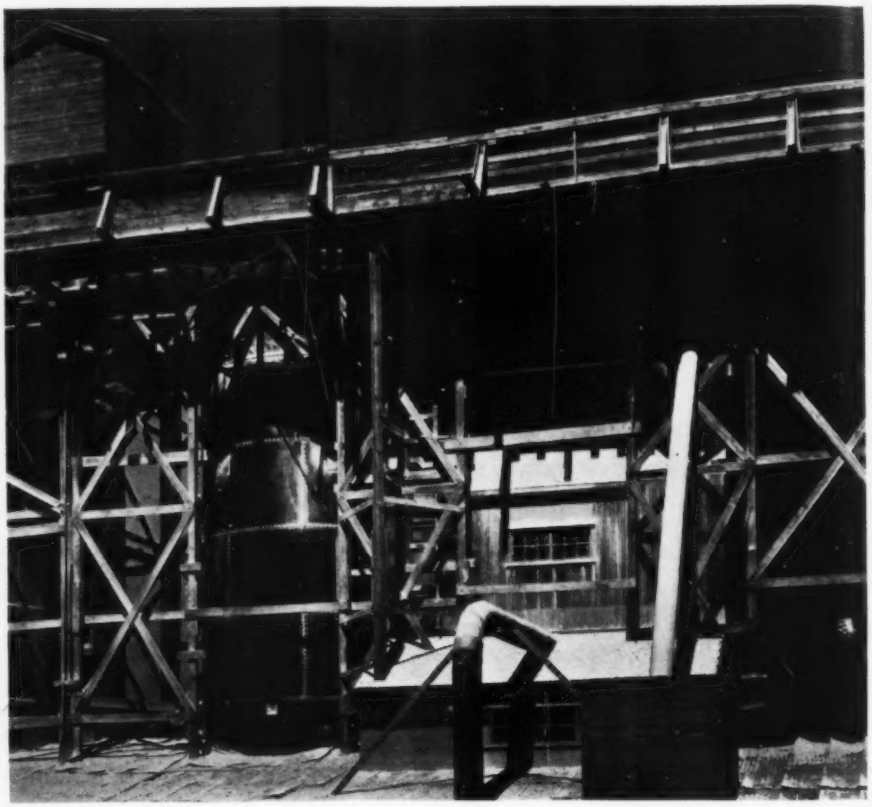
Utah Lime Installs Fourth Calciner—A Completely Automatic Operation

THE Utah Lime and Stone Company has recently completed the installation of a fourth Ellernan calciner at its plant at Dolomite, Utah. This is a No. 2 unit, having a capacity of 12 tons of burned lime per 24 hours.

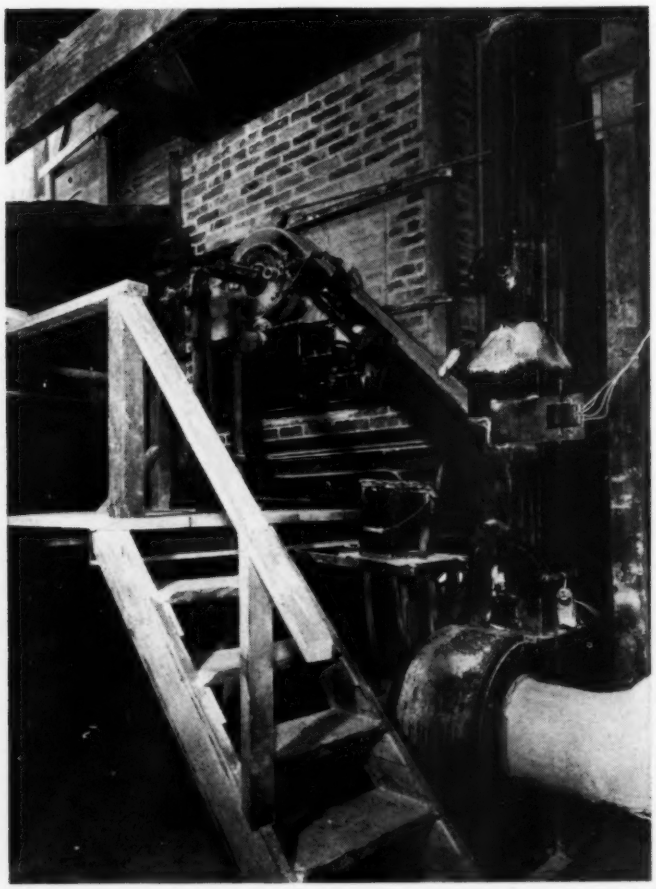
One of the company's old type "Keystone" vertical kilns was torn down and the calciner installed in its place. The old kilns had steel shells, 13 ft. in diameter and 42 ft. high and were placed on 16-ft. centers. The No. 2 Ellernan calciner is designed to be installed on 16 ft. centers, and the height overall to the top of the main supply bin is 40 ft., a comfortable fit for the space formerly occupied by the vertical kiln. The calciner was installed on the old firing floor; and the discharged lime drops through into an 8-ton hopper placed where the cooling and draw cone of the old kiln was located. A portable conveyor takes the lime from the hopper, either to a storage bin for bulk loading, or to the hydrating plant.

An interesting feature of this new installation is that the calciner is operated under complete automatic control. The oven is equipped with a thermocouple which is connected to a Bristol 0 to 3000 deg. F. recording pyrometer. The pyrometer has a Micro-act controller operating two small Penn damper motors, one located in the main exhaust gas piping and the other in the recirculation gas piping. Oven temperature is set at 2350 deg. F., and a slight variation in this temperature opens or closes the two dampers and increases or decreases the flow of recirculated gases through the oven. This auto-

(*Continued on page* 120)

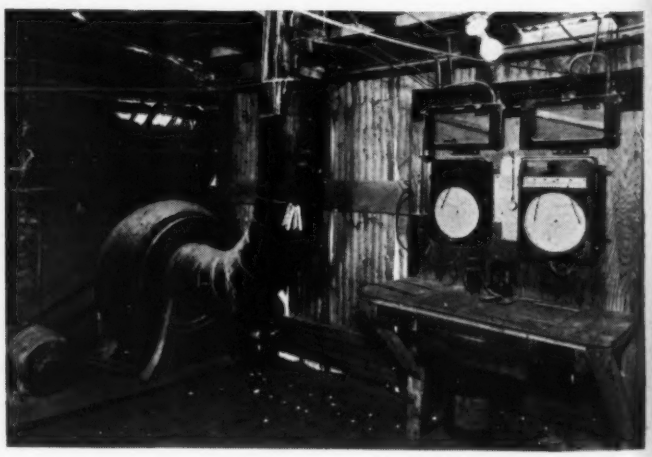


• At the Utah Lime and Stone Company's plant at Dolomite, Utah, the new calciner fits neatly into the space of the old vertical kiln it replaced.



• This view shows the oil burner arrangement and the recirculation fan, with its automatic damper.

• Below: The instrument panel and main exhaust fan, checked hourly for accuracy. Once in 24 hours the main supply bin is filled and the lime is sampled.



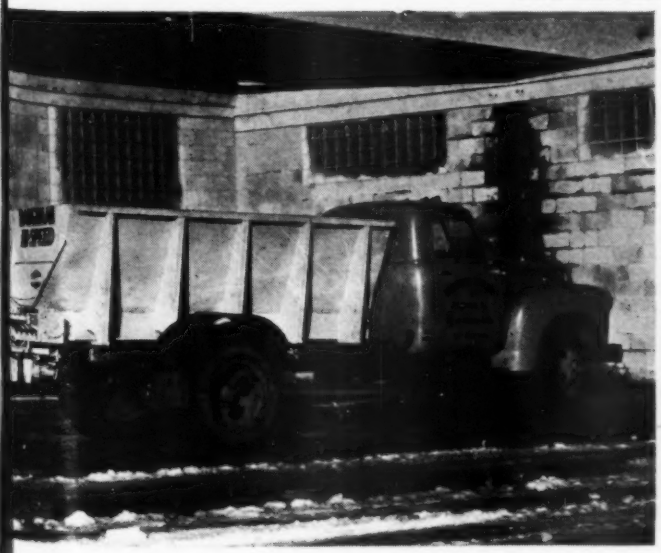
New Developments in Lime Spreader Bodies

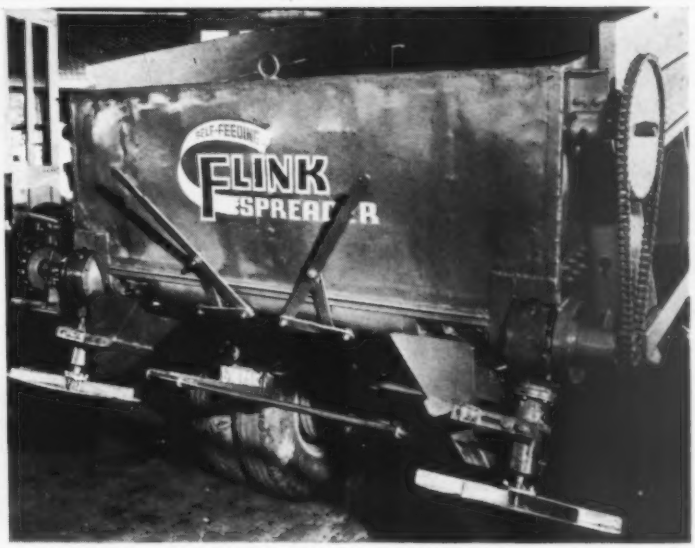
A SPREADER equipped with chain and slat unloading and manufactured by the Even Spread Co., is illustrated in the *upper right-hand* photograph. Spreading is done by detachable distributor tubes with adjustable openings in the bottom. Speed of both conveyor and distributor is adjustable to the requirements of different materials as well as rates of application. Safety slip clutches and other safety devices are provided in the driving mechanism. The tubes are held by a simple device which keeps them firm on rough ground but readily releases them if an obstruction is encountered.

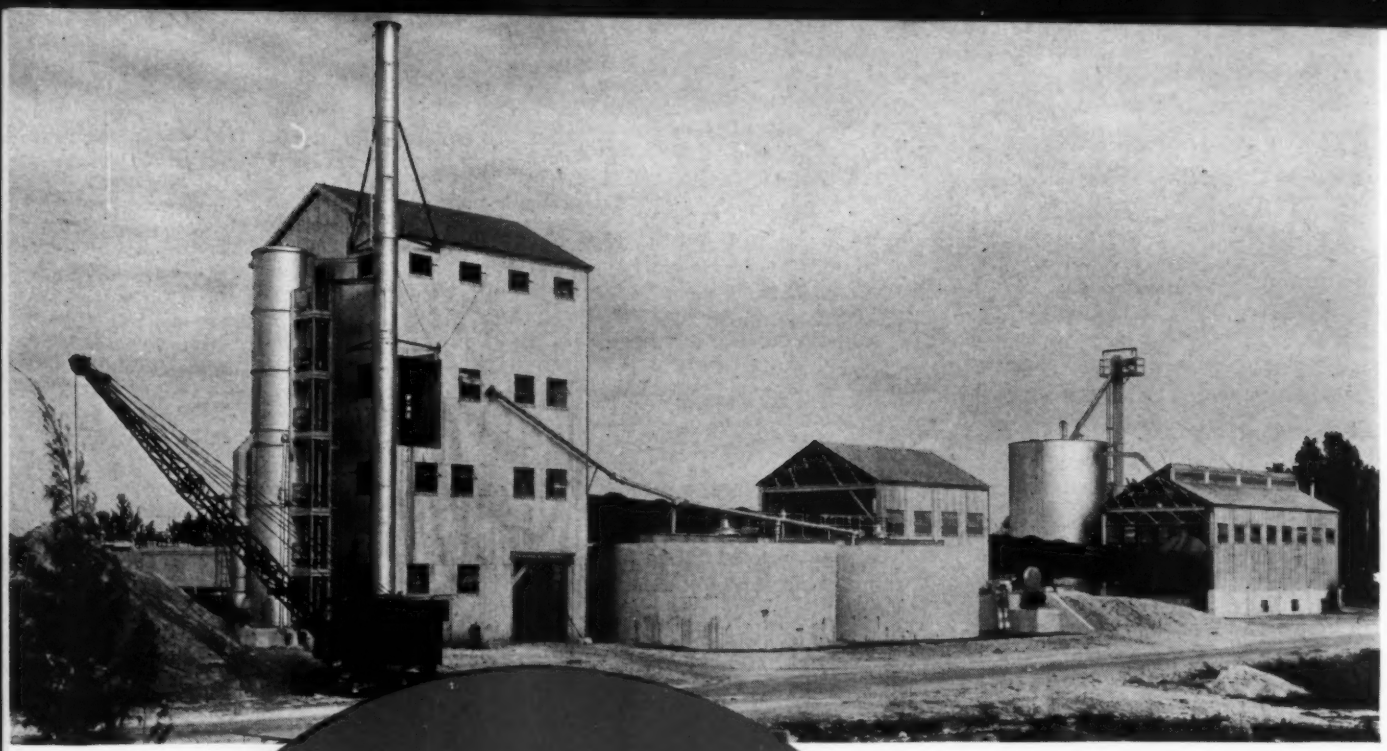
The lime spreader shown in the *right center* photograph is a heavy-duty unit made by the Anthony Company. Desirable combined spinner and conveyor speeds suitable to ground speeds are accomplished by changing the sprocket size in the chain sprocket arrangement, thus eliminating the need of various gear ratios in the power take-off or special gearing in the distributor gear cases. Automatic conveyor chain adjustors keep the chain properly adjusted for all loads, while springs within the adjustor housing maintain accurate tension. A sliding-type universal joint compensates for flexing of the truck over rough ground. Spread may be limited to the width of the truck by turning the spreaders up-side-down.

In the Baughman spreader (*lower left*) the beater at the rear of the body breaks up material and forces it down the twin distributor fans, which travel in opposite directions to accomplish even spreading. The sides in this model are considerably more steep than in the regular lime body which incorporates a bottom dumping feature, level-controlled at the immediate rear and left of the driver's cab door. This allows material to dump through the bottom of the body with an opening of at least

(*Continued on page* 186)





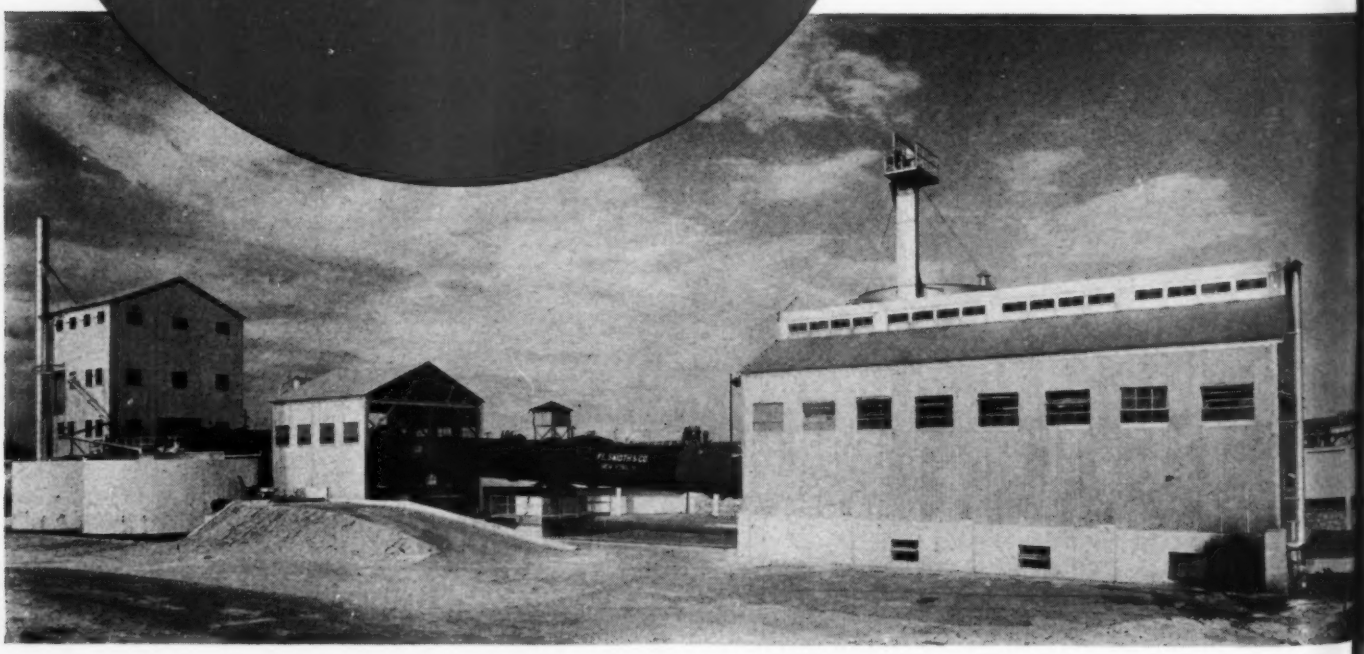


General view of the Hialeah Water Treatment Plant, showing (left to right) the feed building, thickeners, kiln, and kiln firing and cooler building.

Lime light on Water Treatment

By
W. R. Cliffe,
Consulting Engineer
and
C. R. Atherton,
Chief Engineer
L. I. M. E.

This view, from the opposite end of the plant, shows the rotary lime kiln extending from the feed building (left) to the kiln firing and cooler building (right).



Hialeah Water Treatment Plant Uses new rotary lime kiln to Calcine hard water waste for Use in further water softening

another P-Q exclusive

UNDER certain conditions hard water bears the seeds of its own destruction. The City of Miami has recently proved the truth of this statement at the Hialeah water treatment plant operated by the Miami department of water and sewers. A new rotary lime kiln plant now converts hardness removed from water in the softening process into lime which, in turn, can be used for further softening of water. Even more interesting is the fact that the amount of lime recovered exceeds the softening treatment requirements by a margin of approximately 50 percent.

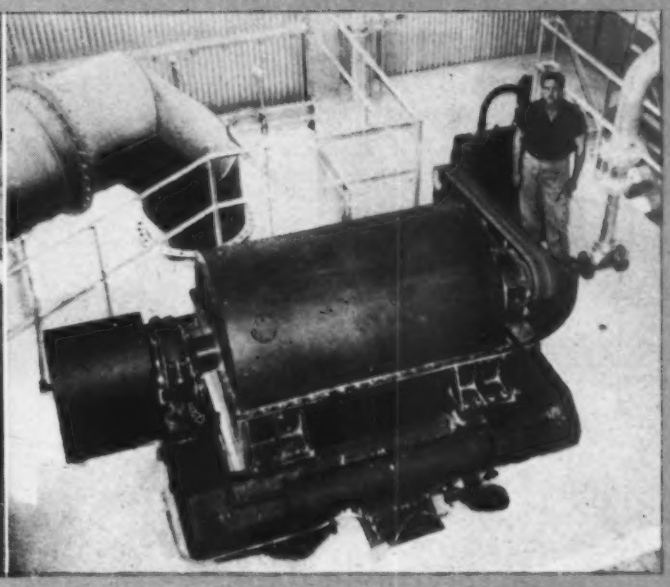
The plant, which represents the culmination of several years of careful planning and concentrated effort on the part of all concerned is designed to recover all the lime used in the softening process, together with the lime contained in the carbonate hardness of the water. The high calcium bicarbonate hardness accounts for the excess over the treatment requirements.

Successful operation of the plant, the first of its kind, will save the city of Miami an estimated $94,800 in lime costs in the first year of operation. This saving will increase as city water consumption increases. An additional profit is expected from the sale of approximately 8,000 tons of lime per year over and above the present requirements of the treatment plant. Total savings will en-

Right: Auxiliary lime bin for bulk loading of excess lime. In background is feed building.

Lower left: Wash mill for reducing sludge to a consistency comparable to that of the underflow from the clarifiers.

Lower right: Centrifugal filter in which slurry is dewatered.



able the city to pay off the capital investment in from seven to eight years.

Complete details of the installation are to be found in the article which follows. A general flow diagram is presented in pictorial form to assist in following the entire process.

Source of Raw Water

To the west of the city of Miami the vast reaches of the Everglades occupy the majority of the southern part of the Florida peninsula. The Everglades forms a natural storage basin in which water is retained by eastern and western coastal ridges of oölitic limestone several miles in width and reaching an elevation of approximately 15 ft. above mean sea level.

Near Miami the ground in the Everglades is somewhat lower than the coastal ridge. It slopes gradually upward toward the north and in the vicinity of Lake Okeechobee, reaches an elevation of 16 to 17 ft. above sea level.

There are no natural water courses through the Everglades, and the canal system which was begun in 1910 to drain the area for cultivation cannot accommodate the run-off during wet periods. As a result, the water either seeps into the ground, evaporates, or moves slowly over the surface as a broad sheet.

The topography described above is such that the 'Glades become the source of a continuous and plentiful supply of raw water for the cities located along its eastern edge.

Miami's 22 wells have an average depth of 85 ft. and have been drilled in the surface rock close to the edge of the 'Glades. These wells are scattered over a fairly large area in Hialeah, Miami Springs, and Dade County. Each well is equipped with a motor-driven centrifugal pump which discharges into a manifold pipe line extending from the well fields to the water treating plant. The 60-in. cast-iron main raw water line is at present the largest water pipe line in Florida.

Characteristics of Raw Water

The water as drawn from the ground is fairly hard and rather highly colored. Without treatment, it would not be suitable for public consumption.

Complete information with respect to the quality of the raw water is given in the table below. It should be noted that in the raw water the carbonate hardness is approximately 7.3 times the non-carbonate hardness and the calcium fraction is approximately 14 times the magnesium fraction. These two facts combine to establish the practicality of lime recovery from the precipitated sludge, as will be shown in the following section.

Water Softening Process

In the Miami water treatment process the low-non-carbonate hardness of the water eliminates the necessity for soda-ash treatment. The water softening method used therefore consists essentially of the addition of milk of lime to the raw water. The lime is slaked and reduced to a milk of lime of a predetermined concentration at the chemical house. The milk of lime is pumped to the mixing tanks where, together with a flocculating agent, it is quickly and thoroughly mixed with the raw water. The water is then passed to the flocculators, where slow-moving horizontal-shaft paddles aid the coagulation of the finely divided insoluble carbonates produced by the combination of the lime with the carbonate hardness of the raw water. Large siphons take the water from the flocculating tanks to the center of the clarifiers. Inflowing through these large tanks, the insoluble carbonates are allowed to settle out in the form of sludge. The relatively high percentage of calcium present in the raw water results in the production of a sludge containing a heavy concentration of calcium carbonate and relatively little magnesium carbonate.

For many years the sludge has been pumped from the clarifiers to a large sludge lagoon, where it has been settled and the water partially drained off. This lagoon, 3000 ft. as the crow flies from the treatment plant, now contains approximately eight million cu. ft. of calcium carbonate sludge having a solids content of about 50 percent by weight. There is thus available for recovery from the lagoon an estimated 175,000 tons of dry calcium carbonate. This, of course, is in addition to the continuous supply of similar material being produced daily by the actual water softening process.

Quantities of Water Softened

The fluctuations in the demands made upon the Miami water treatment plant are somewhat different from those normally encountered in connection with municipal water supply because of the great influx of visitors during the winter months.

The present water treatment plant has a rated capacity of sixty million gallons per day, reached only on a few peak days when the tourist trade is at its height. Water treated during the off-season period from June to October averages approximately forty-two million gallons per day.

An additional well field and water treatment plant is now being planned for the south half of the city to satisfy the ever increasing demands for water. The new plant will have an initial capacity of forty million gallons of water per day and will lagoon the sludge resulting from treatment.

Typical Analysis of Raw and Treated Water
City of Miami, Florida
(As Reported for Nov. 1947)

Item	Reported As	Raw Water	Raw Treated Water
pH		7.3	8.7
Color		60.	23.
Ammonia nitrogen, free ammonia	N	0.50 p.p.m.*	0.50 p.p.m.
Carbon dioxide, free	CO_2	21. p.p.m.*	None p.p.m.
Total dissolved solids		350. p.p.m.*	190. p.p.m.
Silica	SiO_2	9.0 p.p.m.*	9.0 p.p.m.
Iron, total	Fe	0.9 p.p.m.*	0.02 p.p.m.
Calcium	Ca	98. p.p.m.*	25. p.p.m.
Magnesium	Mg	7.1 p.p.m.*	4.0 p.p.m.
Sodium and potassium	Na	27. p.p.m.*	27. p.p.m.
Alkalinity	$CaCO_3$		
Phenolphthalein		0.0 p.p.m.*	5.0 p.p.m.
Methyl orange		220. p.p.m.*	40. p.p.m.
Sulphates	SO_4	37. p.p.m.*	40. p.p.m.
Chlorides	CI	35. p.p.m.*	35. p.p.m.
Non-Carbonate hardness	$CaCO_3$	30. p.p.m.*	35. p.p.m.
Total hardness	$CaCO_3$	250. p.p.m.*	80. p.p.m.
Hydrogen sulphide	H_2S	1.2 p.p.m.*	None p.p.m.

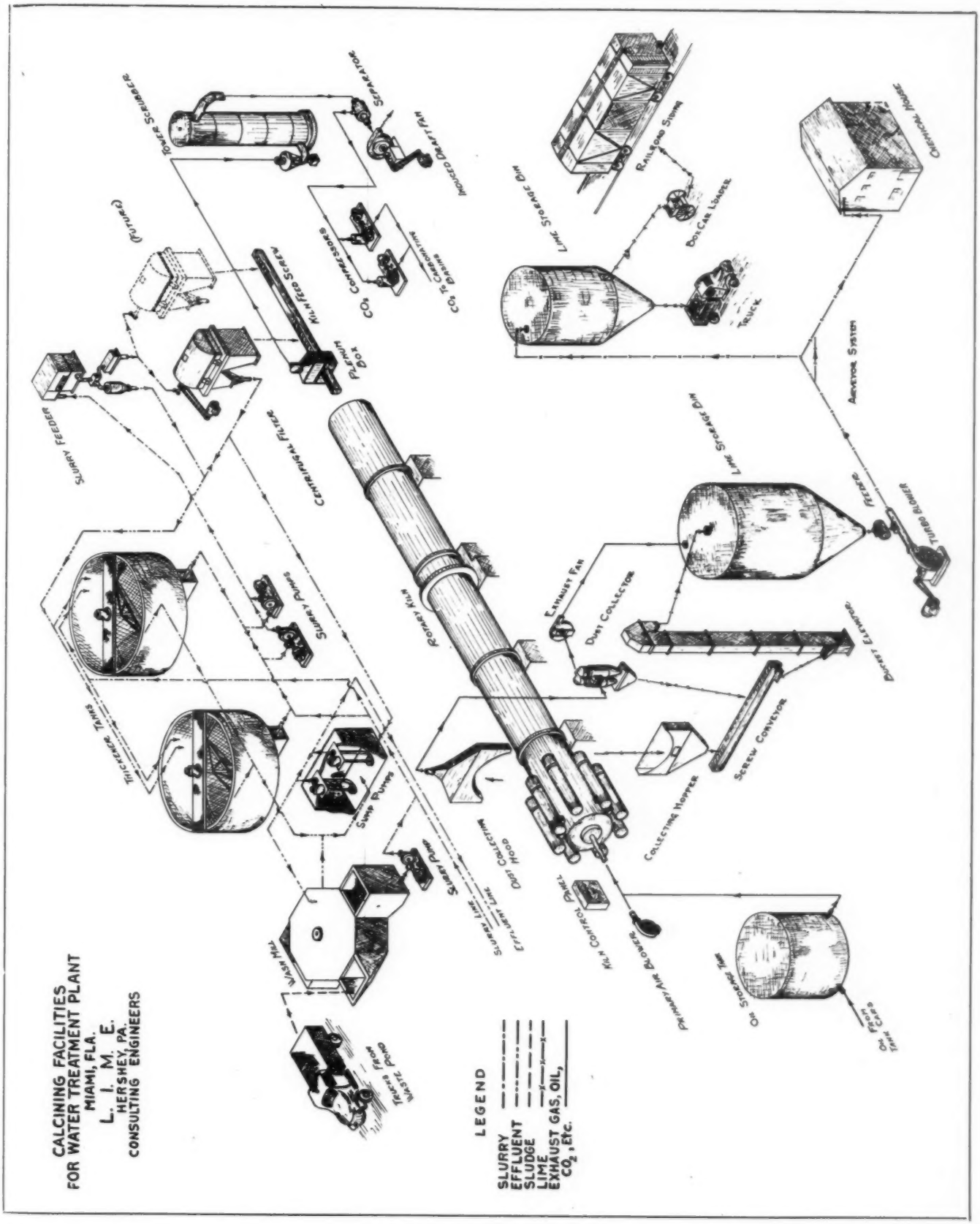
*p.p.m.=parts per million; 17.1 p.p.m.=1 grain per U. S. gallon.

Quantity of Sludge from Treatment

The amount of dry calcium carbonate sludge available from the water treatment is approximately 2.7 times the number of tons of lime used in the treatment process.

This material is derived from two sources: (a) The lime used in treatment which reconverts to calcium carbonate, and (b) the carbonate hardness in the water which, by the method of treatment, is coagulated and precipitated.

Standard lime treatment requires a dosage of approximately 1600 lbs.



of calcium oxide per million gallons of water. On a theoretical basis, this reconverts to 2,860 lbs. of calcium carbonate.

Treatment reduces carbonate hardness from 220 to 45 parts per million or by 10.2 grains per gallon. This is equal to 1460 lbs. per million gallons.

Thus the dosage of 1600 lbs. of lime produces a total of 4320 lbs. of calcium carbonate, dry basis. This figure disregards the products from the magnesium carbonate and bicarbonate in the raw water. The amount of magnesium carbonate precipitated by treatment is about 2 percent of the total solids.

Examination of the fundamental formulas

$$Ca(HCO_3)_2 + Ca(OH)_2 = 2\,CaCO_3 + 2\,H_2O$$

$$Mg(HCO_3)_2 + Ca(OH)_2 = MgCO_3 + CaCO_3 + 2H_2O$$

$$Mg\,CO_3 + Ca(OH)_2 = Mg(OH)_2 + Ca\,CO_3$$

will serve to show the nature of the

reaction and the conversion of the carbonate hardness, actually largely bicarbonates, to insoluble calcium carbonate.

Calcination of the sludge from one million gallons of water will produce 2400 lbs. of lime. This figure represents an increase of 50 percent over the amount used in treatment and provides a basis for determining calcining plant production rates.

Lime Plant Capacity

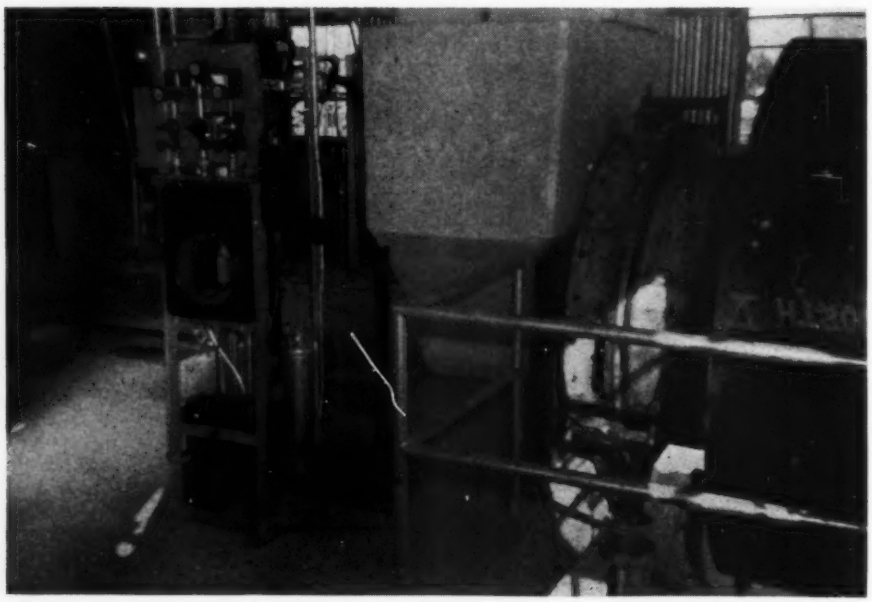
A number of factors were important in establishing the capacity of the proposed lime plant. The chief consideration was, of course, the requirements of the city water department for treatment purposes.

At capacity production the existing treatment plant requires 48 tons of calcium oxide per day. The proposed treatment plant in the southeastern section will require 16 tons per day for initial operation and possibly 32 tons per day as population growth increases the demand for water.

The required lime production capacity was therefore established at 80 tons per day. It will be noted that complete lime recovery from the sixty-million-gallon plant operating at capacity would total only 72 tons per day, and that during the periods of low water requirement this figure would drop to an average figure of about 50 tons per day.

The availability of a large reserve of sludge in the lagoon offers the solution to the problem of variable sludge supply from the treatment plant. Provision has been made to utilize this source of raw material in order to provide for a uniform rate of lime production and accompanying high efficiency essentially independent of the rate of delivery of fresh sludge from the clarifiers. Lime produced in excess of the requirements of the water treatment plants will be available for sale to outside purchasers. Details of the entire operation are contained in the following sections.

Slurry feeder installation with capacity of 10,000 g.p.h. of slurry.



Kiln feed end installation, showing feed screw, plenum box and cold end seal, with gas-analyzing equipment in the foreground.

Preparation of Sludge

Efficiency of kiln operation combined with uniformity and high quality of lime are dependent to a large degree upon the uniformity of the raw material fed to the kiln. Since this raw material is drawn from two sources—the clarifiers and the lagoon—and since the water content of the sludge in this state is highly variable, facilities have been provided to reduce the material to a uniform condition.

The underflow from the clarifiers is pumped directly to the central stilling wells of the two reinforced concrete thickener tanks. These tanks, each having a capacity of 8,500 gallons, serve in the dual role of thickeners and storage tanks. Each is equipped with a Hardinge 32- by 15-ft.-deep special thickener with Auto-Raise drive mechanism. A 5-hp. motor drives the scrapers through a mechanical speed changer which provides for a selection of scraper rotation rate anywhere between 1/5 and 1 r.p.m.

Material from the lagoon is recovered by means of a Sauerman 1/3-cu. yd. Crescent-type scraper operated in conjunction with an Ingersoll-Rand 15NNN-3D 3-drum scraper hoist with 15-hp. motor. The sludge is dumped from a semi-permanent scraper ramp into trucks and is hauled to a wash mill at the plant site where, by the addition of water, it is reduced to a consistency comparable to that of the underflow from the clarifiers. The wash mill mechanism operates in a 10-ft.-diameter by 6-ft.-deep concrete tank, and is driven by a 20-hp. 600-r.p.m. motor and V-belt drive. The wash mill outlet is equipped with grate bars to prevent sticks, leaves, and other foreign matter from reaching the pump.

Slurry is pumped from the wash mill to the thickeners by means of a Wilfley centrifugal sand pump, Model "C", Size 2, direct-driven by a 10-hp. motor.

By means of the installation described, it is possible to maintain a relatively uniform percentage of solids in the thickener underflow. During the preliminary testing period and in spite of wide fluctuations in the solids content of sludge from the clarifiers, the underflow from the thickeners varied from 16.7 percent to 22.0 percent solids with an average of 20.3 percent and with the majority of the samples falling between 19.5 and 20.5 percent.

These results, combined with later data gathered during actual operation, indicate that the thickeners effectively level out the intermittent fluctuations in the solids content of the entering slurry.

The underflow from the thickeners is forced by means of two Wilfley centrifugal sand pumps, Model "C", Size 2, direct-driven with 7½-hp. motors, to an F. L. Smidth single spiral scoop slurry feeder installed on the top floor of the feed building. This feeder has a capacity of 10,000 g.p.h. of slurry and is driven by means of a 4-speed motor, thus providing for synchronization of feed rate and kiln rotation rate. The synchronization is not automatic but is controlled by push buttons on the firing floor.

The excess of slurry over kiln feed requirements is returned by gravity from the feeder to the thickeners, while material destined for the kiln flows directly to the centrifugal filter for dewatering. The amount of slurry being delivered by the feeder may be quickly and accurately measured by temporarily diverting the flow into a control bucket for a timed interval.

Slurry is dewatered in a 40- by 60-in. Bird centrifugal filter powered by a 60-hp. motor with V-belt drive. This unit delivers a filter cake containing approximately 67-68 percent solids by weight to the kiln feed screw. Filtrate from the centrifuge contains approximately 2 percent solids by weight and flows by gravity to the plant sump, where it joins other waste and overflow water and is pumped to the lagoon or the wash mill. A considerable portion of the magnesium compounds contained in the slurry is removed in the centrifugal filter. The fact that the original percentage of magnesium is very low makes it possible to re-use the filtrate in the wash mill without fear of excessive build-up in the finished product.

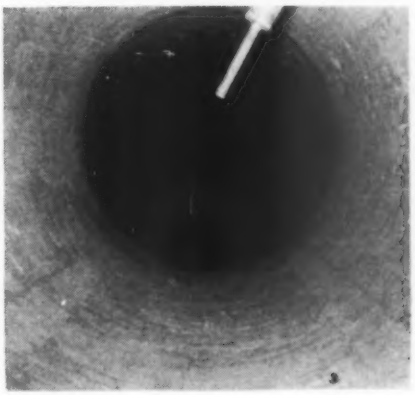
Right: The dust hood at the cooler discharge point, which completely covers the discharge end of the coolers.

Kiln Feed Screw—Rotary Kiln

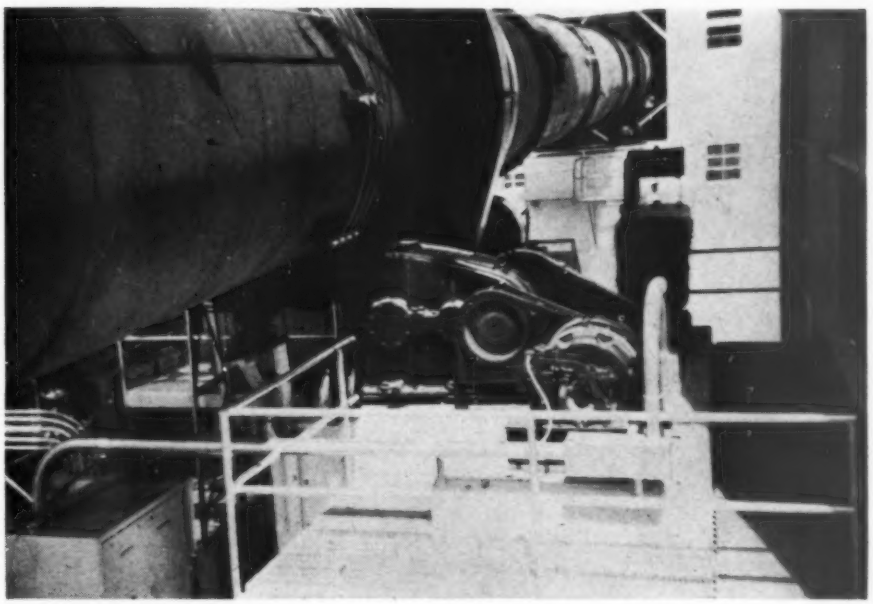
The kiln feed screw into which the filter cake falls by gravity from the centrifuge is a 14-in.-diameter ribbon-type screw conveyor direct driven at 40 r.p.m. by a 3-hp. motorized speed reducer. The feed screw passes through a plenum box and discharges the cake at a point just inside the feed end of the kiln.

The rotary kiln proper is an F. L. Smidth and Co. 4-support Unax kiln of welded design, 7 ft. 6 in. I.D. by 230 ft. long with integral multicylinder Unax cooler. The feed end of the kiln is equipped with a 37-ft. section of induced draft-type heat recuperating chain to promote efficient heat exchange and rapid drying of the sludge at the feed end of the kiln. Kiln exist gas temperatures of 350—450 deg. F. give ample evidence of the efficiency of this system.

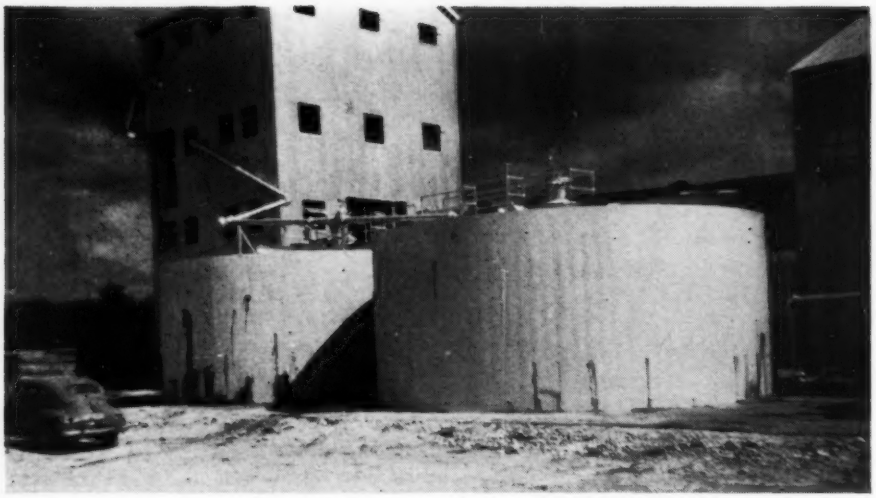
The kiln shell is provided with sampling ports and thermocouple



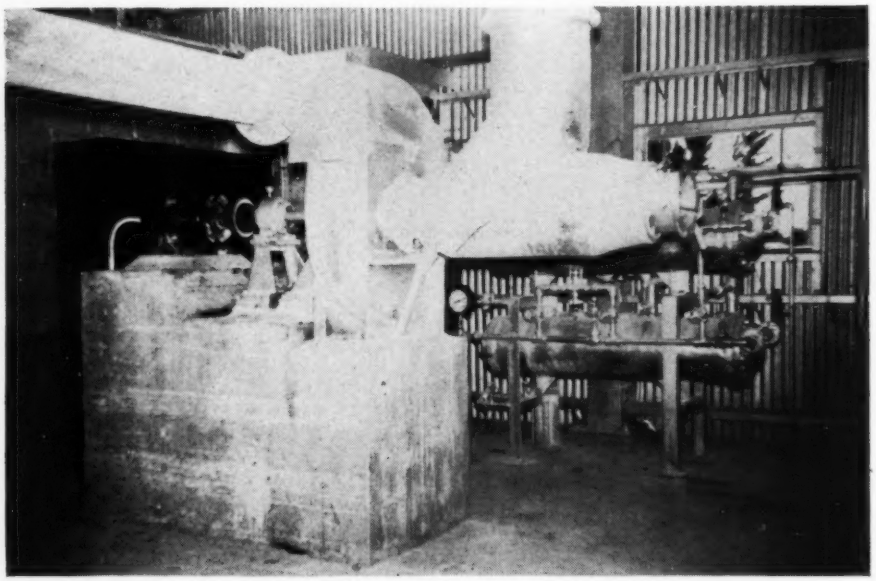
A portion of the lining with chain section is shown in this closeup view.



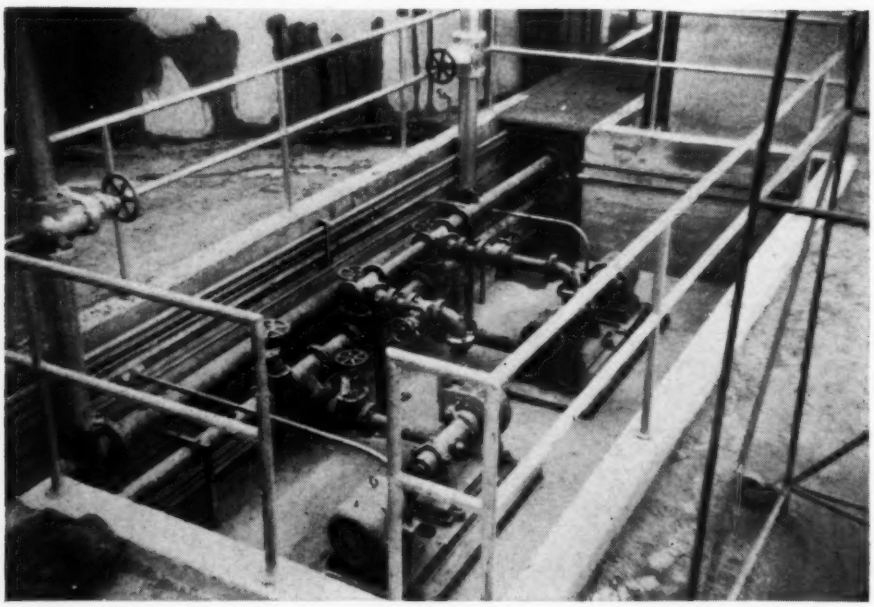
Drive pier details. This view illustrates the design and construction of the piers to provide ease of access to the drive, the roller assemblies and all other points requiring inspection and maintenance.



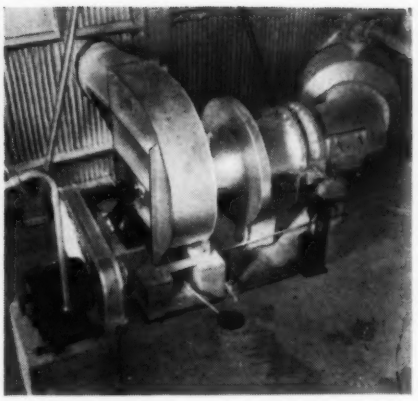
Reinforced concrete thickener tanks which receive the underflow from the clarifiers.



The primary air blower installation, with fuel oil heaters in the background.



The slurry pump pit and the service trench, which contains electric conduits, air lines and water and slurry piping.



Induced-draft fan and damper. The fan can handle 12,500 c.f.m. of moisture-saturated gases at 90 deg. F.

wells to simplify the testing and control procedure. The kiln is lined throughout with Harbison-Walker refractories. The discharge end corbelling occupies the first 10 ft. and is built up with Varnon. The next 40 ft. are lined with 6 in. of Alusite. The intermediate zone lining consists of 100 ft. of 6-in. Crown laid on 2 in. of Johns Manville Super-X, and the balance of the kiln, including the chain section, is laid up with 6 in. of Wylam Acid. The 31 ft. of Wylam Acid immediately above the intermediate zone is also insulated with 2 in. of Super-X. The coolers are not lined.

The kiln is driven by a 4-speed motor rated 40/30/20/15 at synchronous speeds of 1200/900/600/-450 r.p.m., with V-belt drive to the high-speed shaft of a Western Gear Works OD60—Special reduction gear, ratio 70:1 with outboard bearing. The 19-tooth master pinion is mounted on the slow-speed shaft of this reduction gear and engages a 136-tooth girth gear. The total ratio of reduction is 1060-to-1 and provides for operating speeds of 1.09/.85/.57/.43 r.p.m.

A standby drive is also provided to operate the kiln in the event of power failure. This drive consists of an International Harvester Model V-9 gasoline power unit rated 44 hp. at 1500-r.p.m. This unit is direct-connected through a flexible coupling to a Philadelphia Gear Works herringbone reduction gear, Size 3107, Type HT, with 6:1 reduction ratio. The low-speed shaft of this reducer is connected by roller chain drive with the high-speed shaft of the kiln speed reducer. The emergency drive will operate the kiln at approximately 1/8 r.p.m.

A thrust mechanism with electrical safety stop is provided in connection with the No. 3 tire to prevent longitudinal over-travel of the kiln. The kiln motor is provided with a

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Throughout the rock products field Sly Dust Control Systems are saving thousands of dollars yearly—by improving working conditions, eliminating health hazards, prolonging the life of machinery, reducing cleaning and maintenance costs, and recovering valuable materials. Because of these savings Sly Dust Control proves a paying investment—often soon repays its cost.

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magnetic brake to eliminate back travel of the kiln when stopped while loaded.

The design and construction of the piers provides ease of access to the drive, the roller assemblies, and all other points where inspection and maintenance are required.

The integral cooler is of the inverted type and is equipped with conveying flights of heat-resistant cast iron. Lime from the coolers is discharged into a collecting hopper, passes through a set of grate bars and is removed to storage by a screw conveyor and bucket elevator.

The dust hood runs completely around the kiln, encasing the discharge end of the coolers to the maximum possible extent. Since all secondary air is drawn into the coolers at this point, a slight negative pressure is maintained and dust which normally boils into the atmosphere above the discharge hopper is completely controlled. Two Buell cyclone collectors, Size 4¼-A1 with American Blower No. 300 Type E Fan, V-belt drive, and 3-hp. 1800-r.p.m. motor, are installed on a platform above the dust hood for reserve protection. Up to this time it has not been necessary to call upon this additional dust collecting capacity to obtain a dust-free operating platform.

Kiln Firing Facilities

Bunker "C" oil for the kiln is delivered in tank cars on a siding adjacent to the plant and is pumped to storage in a 30-ft. I.D. by 20-ft. high oil storage tank. This tank was for years used as a mix tank in the water treatment plant. The installation of reinforced concrete mix tanks in the course of recent plant expansion released the tank, which was modified so that it would be suitable for its present service.

The kiln is fired by a mechanical high-pressure oil atomization system. The operating oil temperature and pressure are 200-220 deg. F. and 240-260 lbs., respectively.

Oil is pumped from the storage tank by two 1½-in. DeLaval-IMO dual oil pumps, with 5-hp. motors to two tubular multi-pass fuel oil heaters each capable of heating the required amount of fuel oil from 80 deg. F. to 200-220 deg. F. Steam for the fuel oil heaters is provided by an MkayO steam boiler having an A.S.M.E. heating surface rating of 12.3 hp. The fuel oil lines are furnished with complete automatic controls, strainers, temperature and presure gauges, and a fuel oil meter.

The kiln burner proper is of Schutte & Koerting manufacture and consists of a 20-ft. 6-in. burner pipe, calorized at the firing end, axially located in an 8-in. I.D. by 20-ft. long primary air tube. The burner pipe assembly is mounted on overhead rails to simplify the problem of withdrawal of the end shield. The entire burning operation is characterized by unusual quietness.

Primary combustion air for the kiln is provided by a No. 41 KBE primary air blower rated at 2300 c.f.m. of 200 deg. F. air and capable of developing 8-in. static pressure. Direct connection with a 7½-hp. motor provides an operating speed of 1750 r.p.m. In normal operation primary air is drawn from the top of the kiln end shield. A damper for controlled admission of air at atmospheric temperature provides protection against overheating the fan.

Induced Draft Fan and Damper

Draft control for the kiln is provided by a 30-in. butterfly damper in the exit duct immediately ahead of the induced draft fan. The damper is driven by a 1/15-hp. motor with electrical controls which include a reversing starter having safety limit stops and a position indicator sending unit. The pilot motor is arranged for operation with the oxygen analyzer control equipment but may be thrown over to manual control if desired.

The induced-draft fan is a No. 18

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Jaw crushers . . . the balancing unit in the material reduction circuit and one of the most important factors affecting the final cost of the finished product. Rogers crushers, in 18 sizes, are individually designed and correctly proportioned with long crusher jaws placed at the correct angle to secure superior crushing action, greater capacity, less slippage, less wear and less replacement costs. Bearing sizes are from two to three sizes larger than normally recommended . . . shaft diameters are likewise oversize, assuring freedom from breakdown and long, trouble-free service.

PRIMARY CRUSHERS IN 6 SIZES
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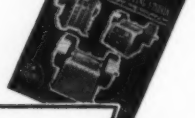
● Write for this folder on Rogers Jaw Crushers for more complete information. If you have a specific problem, consult our Engineering Department, no obligation.



ROGERS IRON WORKS CO.

JOPLIN, MISSOURI

F. L. Smidth of non-overload design driven through a V-belt drive by means of a 25-hp., 60-r.p.m. constant-speed motor. The fan is capable of handling 12,500 c.f.m. of moisture-saturated gases at 90 deg. F. and of developing a static pressure of 7½-in. at design speed. The interior of the fan is protected with a sprayed coating of Bisonite.

The unusually low temperature and high static pressure provided for result from the inclusion of a wet scrubber between the feed end of the kiln and the induced draft fan.

Gas Scrubbing for Dust Control

The location of the lime plant in a residential area necessitates careful and continuous control of the dust nuisance. It was understood from the inception of the recovery process that dust, even in small quantities, could not be tolerated.

As the result of careful study of this problem, the final installation includes a Bartlett-Hayward water scrubbing tower with humidifier capable of cooling and cleaning 20,000 c.f.m. of kiln exit gases containing 13 lbs. per minute of lime dust from an initial temperature of 550 deg. F. to an outlet temperature of 90 deg. F.

Kiln exit gases pass directly to the top of a 36-in.-diameter humidifier provided with two spray nozzles discharging against a deflector plate. Intimate contact between the gases and the initial sprays occurs in this section. Gases then pass downward and enter the base of the 8-ft.-diameter by 50-ft. 6-in. high scrubbing tower, where they flow counter current to the cooling and scrubbing water admitted to the tower by a series of nozzles axially located approximately 8 ft. apart inside the tower. Multiple layers of wood grids installed above and below each spray nozzle break up both gas and water streams and accomplish both dust removal and gas cooling with a high degree of effectiveness.

The scrubber shell is built in six cast-iron flanged sections, gasketed to prevent leakage. Each section is provided with a 17- by 24-in. manhole door to simplify maintenance.

From the top of the scrubbing tower, the cooled and dust-free exit gases pass to the induced draft fan and are vented to the atmosphere through a 3-ft. I.D. by 80-ft. high steel stack.

The efficiency of dust control is such that cleaned exit gases are invisible at the top of the stack. Tests indicate that the amount of dust released to the atmosphere is too small to be of any significance.

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The GENERAL MODEL 310 is available with independent chain crowd shovel boom assembly, with crane boom for clamshell, dragline, and hookblock work, and as a hoe. Boom assemblies can be changed with a minimum of effort in the field.

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BA-2

Centralized Kiln Control

Control of the entire installation is centralized in a main panel and auxiliary panel on the burning floor. In addition to control switches for all equipment, the following items are included on the centralized panel: two-point strip-type indicator and recorder to measure and record feed end and intermediate kiln temperatures; recording oil meter; ammeters and kilowatt meters for chief motors; selector switches with indicating lights for the 4-speed motors driving the kiln and the slurry feeder; feed end draft gauge; magnetic revolution counters for kiln and slurry feeder; high-low level indicators with alarms for lime silo; alarm system with silent switch for induced draft fan, kiln feed screw and slurry feeder; electrical CO_2 analyzer and recorder; air-operated combustion control consisting of a temperature recorder controller activated by the thermocouple embedded in the kiln shell below the chain section, and a kiln damper control drive activated by the oxygen controller recorder; position indicating unit for main damper; and telephone system to feed end.

The control panel is of dustproof construction and is carried on a foundation independent of the building foundation. Access to the interior is provided through dustproof doors at the end.

It is anticipated that normal operation will be based on the automatic firing and draft control provided. However, during start-up periods and under other unusual circumstances, the operation may be brought under manual or operator control until conditions warrant return to the automatic basis.

Lime Storage and Handling

Lime from the kiln is discharged into a Link Belt 9-in. screw conveyor 19-ft. 2-in. long. This conveyor is connected through a reduction gear to a 1½-hp. 1800-r.p.m. motor and is operated at 50 r.p.m.

The screw conveyor discharges into a Link Belt No. 766 vertical continuous bucket elevator, 68-ft. 5-in. c-c shafts. The headshaft of this elevator is driven at 25 r.p.m. by a 3-hp. 1800-r.p.m. motor connected through a Link Belt reduction gear. A safety ladder and platform at the head of the elevator provides an opportunity for proper maintenance and for emergency repairs. The same safety ladder gives access to the roof of the lime storage silo.

Active storage for 400 tons of lime is provided in a 25-ft.-diameter steel

silo furnished by the Chicago Bridge and Iron Co.

A Fuller Airveyor system transports lime from the silo either to the chemical house for use in water treatment or to the auxiliary lime bin for loading on trucks or railroad cars for shipment to outside purchasers. Lime from the silo is fed by a totally-enclosed Fuller feeder into a 6-in. underground pipe line some 650 ft. long, through which it is conveyed by the combined effects of a turbo blower and an exhauster. The turbo blower is located directly under the storage silo and is powered by 20-hp. 3600-r.p.m. motor. The exhauster is located at the chemical house and is powered by a 60-hp. 1200-r.p.m. motor. A horizontal switch in the line, together with a 2-stage receiver and rotary air lock on the auxiliary lime bin, provides for the diversion of lime to this bin at will.

The chemical house installation also includes an air filter complete with motorized feeder, bag shaker, and valve. A distributing screw conveyor with 2-hp. motor, also provided by the Fuller Co., is installed in the chemical house for the distribution of material to appropriate bins.

Alum and soda ash may be moved from a bag hopper in the nearby warehouse to their proper bins in the chemical house through the same system, by throwing a vertical switch in the conveying line.

Control of the Airveyor system is centered in a panel at the chemical house. Operation of this system is therefore entirely independent of the calcining plant and is based on the requirements of the water treatment plant.

Recarbonation

In the Miami water treatment process the water flows to a carbonating basin, where it is treated with carbon dioxide to reduce the pH from 10.5 to 7.5 and to stabilize the remaining hardness so that after-precipitation on the filter beds and in the pipe lines will be minimized.

Until the installation of the lime plant the carbon dioxide was obtained by the use of stack gases from an ordinary furnace operated for the purpose. However, the availability of large quantities of carbon dioxide in the cleaned exit gases from the kiln offered a more than adequate supply of the necessary gas in concentrations much greater than those obtainable by the earlier method. It was therefore decided to install equipment suitable for compression of the required amount of the kiln

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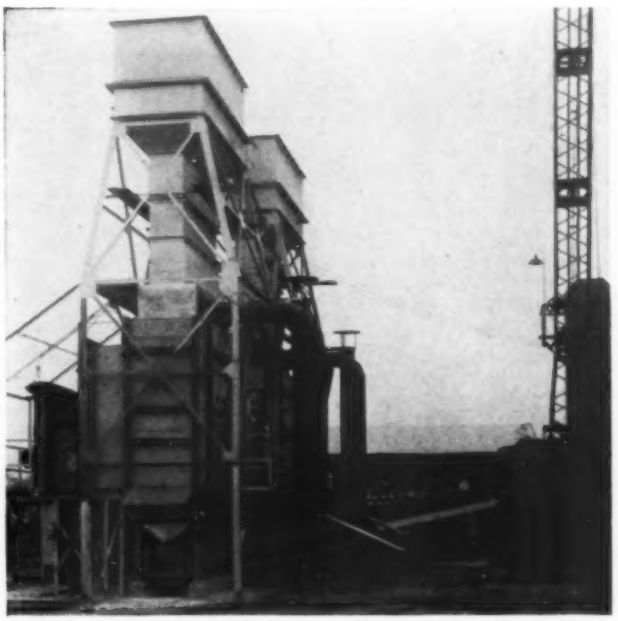

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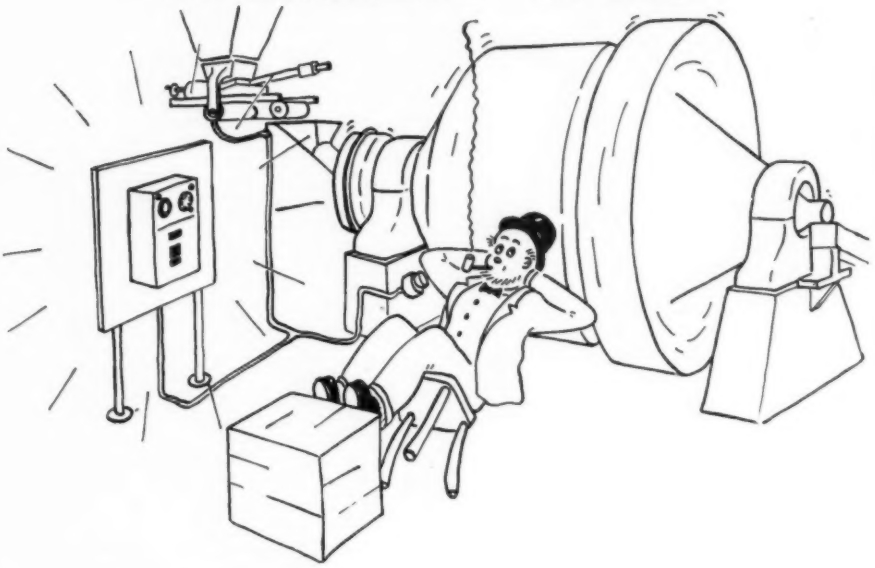
Mike and the Manual Mill



Oh Mike's a brawny Irishman from Ireland's Emerald Greens.
He landed with us years ago when only in his teens.
Mike swabbed our floors and shoveled sands and greased our ball mill gears
He toiled and labored night and day with rolling sweat and tears.

He finally learned to operate our pulverizing plant.
"And thin me troubles just began," (he used to rave and rant).
"I'd pull me gates wot shot the feed to grind, or dry, or mix,
An' alwees git too much or not enough—an orful fix!
The mill'd belch an off-tune note, the dryer'd sizzle hot,
And me, I'd try to find the gate to git us off the spot!"

But years have come and years have gone and times have changed a bit.
A more abundant life has Mike, with much more time to sit.
Sure, Mike and I, we laugh and joke when looking o'er the past,
And think how easy it is now to earn our stew and hash.

A single gadget does the job that gave us all the grief—
No tending gates, no juggling feed, no watching mills; in brief,
Production's up, our costs are down, our product's fine because
"ELECTRIC EAR"* is standing guard . . . and Mike is now "the boss"!

**Registered U. S. Patent Office. The Hardinge "Electric Ear" is the only device of its kind that controls the feed rate in grinding by "listening" to the sound of the rotating load. Write for Bulletin 42-8.*

This saga composed by J. K. Towers, Hardinge Southeastern District Manager, "from personal observation."

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gas and its transfer to the carbonating basins of the water treatment plant.

Accordingly, two direct-connected motor-driven Size L-6 cone-type Nash Hytor compressors powered by 40-hp., 720-r.p.m. motors were installed in the feed end building. Each of these compressors is capable of delivering 570 cu. ft. per minute of free gas at 100 deg. F. against a gauge pressure of 10 lbs. Each compressor is sealed with clean fresh non-recirculated water at a minimum gauge pressure of 5 lbs.

The compressors take suction on the exit gas duct immediately ahead of the butterfly damper. Since the amount of gas diverted is only about 4½ percent of the total flow, the effect on the induced draft fan and damper installation is negligible.

Service Facilities

All waste water including thickener overflow, filtrate, tower scrubber effluent, and cooling water from the kiln bearings and compressors is collected in a 6- by 6-ft. sump from which it may be pumped either to the wash mill or to the lagoon.

The sump pump installation consists of two 600-g.p.m. Yeomans single bilge pumps with float switches, each pump being directly connected to a 15-hp. 1750-r.p.m. motor.

Service air for the lime plant is provided by a Worthington Model 15 TT 2-stage tank-mounted air compressor with 15-hp. motor located in the basement of the discharge end building. Compressed air outlets are located strategically throughout the plant.

All electric conduits, air lines, water and slurry piping, are installed in a straight service trench between feed and discharge buildings to provide the accessibility and ease in maintenance. The service trench is covered with grating except at the pump pits, which are open.

The third floor of the feed end building is equipped with a Manning Maxwell and Moor 8000-lb.-capacity underhung crane and electric hoist. This hoist is so located that the heaviest part of the Bird centrifugal filter can be removed and lowered to the groundlevel if necessary. The outrigger beam of the hoist is so arranged that other heavy equipment can be loaded into trucks with the minimum of difficulty.

Service facilities in the firing end building include shower, toilet, locker, washroom, and public telephone facilities for the operating force and

a public address system connected with the other control centers of the water treatment plant.

The entire plant area is paved and ample parking facilities are provided. Arrangements with the Borough of Hialeah provide for future landscaping in keeping with the surrounding residential area.

Plant Performance

As noted elsewhere, the design capacity of the plant is 80 tons of lime per day. Guaranteed fuel efficiency of the kiln when operating at capacity with a feed containing 65 percent solids by weight is 8,400,000 net B.t.u.'s per ton of product—a highly acceptable figure for this type of operation.

Early operations indicate that the lime produced will be of excellent quality with an oxide availability of 94-96 percent. Nodulization of the kiln product is of an unusually high order. The nodules are of relatively uniform size, varying from ⅝ to ¾ in. in diameter for the majority of the tonnage. They have a high degree of mechanical strength, which prevents their early distintegration under the rigors of handling.

General Information

Plant installation was undertaken under the general authority of the water and sewer board of Miami, John E. Preston, chairman, and of the department of water and sewers, W. A. Glass, director. C. F. Wertz, resident engineer for Day and Zimmerman, Philadelphia, directed the operation on behalf of the city water department. Fred Howland, Inc., of Miami were the general contractors.

Lime Industry Management & Engineering (L.I.M.E.), Hershey, Pa., acted in the capacity of consulting engineers for the project, specifying all equipment and providing detailed engineering for the entire installation. W. R. Cliffe, consulting engineer and head of the firm, directed the operation, with C. R. Atherton, chief engineer, in charge of specifications and design.

Consolidated Feldspar Plant Shows Increasing Production

According to V. M. Matson, superintendent of Consolidated Feldspar Company's Parkdale plant near Canon City, N. M., the current output there is now 300 tons per day.

Mr. Matson stated that the plant is now able to supply sufficient feldspar and silica sand for a good-sized glass factory. Most of the output is used in the manufacture of better-grade glass. The Parkdale plant is one of 15 operated by Consolidated.

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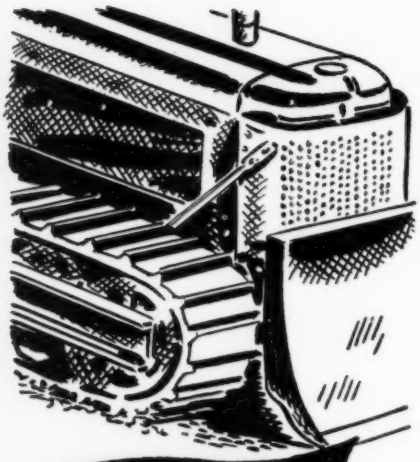

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Utah Lime & Stone

(*From page* 104)

matic adjustment of recirculated gas flow almost immediately corrects the oven temperature. In this installation, the dampers operate about every 60 seconds; oven temperature is held within an overall variation of 20 deg. F.

The new unit has been in operation for several weeks during which the automatic controls have functioned perfectly without manual adjustments. The drive shaft of the discharge mechanism is connected to a Veeder-Root counter, and there is an oil meter in the fuel line.

Every hour a plant operator checks the counter and meter readings to see that proper fuel input and lime output rates are being maintained; and once every 24 hours the main supply bin is filled and the lime is sampled. Other than this, the calciner operates entirely unattended.

Oysters on the Cracked Shell Served to Lucky Chickens

Excavation and processing of what is believed to be the largest concentration of fossil oyster shells in the country is currently being carried on by the Western Lime Products Company at Tapo Mountain, near Santa Suzana, Calif.

The product obtained from the ancient deposit are used in animal and poultry feed and in fertilizer. The beds were discovered by Edward C. Gillibrand, owner of the 5,400-acre Tapo Ranch, and are leased by the family for commercial use. Open-pit mining methods are used, and the shells are dumped by power loaders on trucks for transportation to the grinding mills. Layers of the calcified bivalve skeletons form a deposit at least 2,300 feet in depth—remains of a fairish-sized oyster colony.

Lynn Sand & Stone Company Wins 1948 Safety Award

The Lynn Sand & Stone Company of Swampscott, Mass., was one of the winners of group prizes offered by the Associated Industries of Massachusetts to the industrial plant with the most outstanding safety record in 1948.

Prizes were presented at the Industrial Luncheon during the 28th annual safety conference in Boston on March 14.

According to latest reports, the Volcolite Company, which processes perlite at Puente, Calif., has changed its name and is also owned and operated by a new firm. It is now known as the Merwood Perlite Corporation. The new owners are C. L. Woodworth and associates.

NEW LEADER *Super Deluxe*
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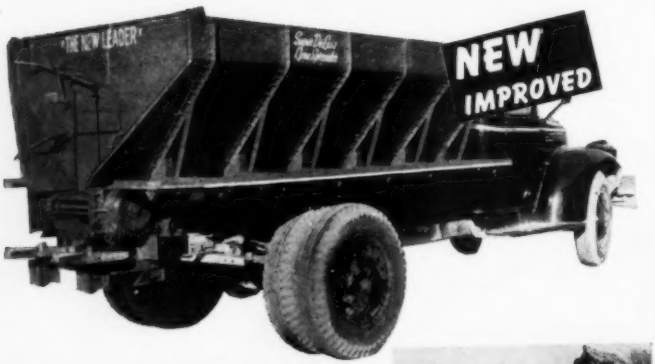

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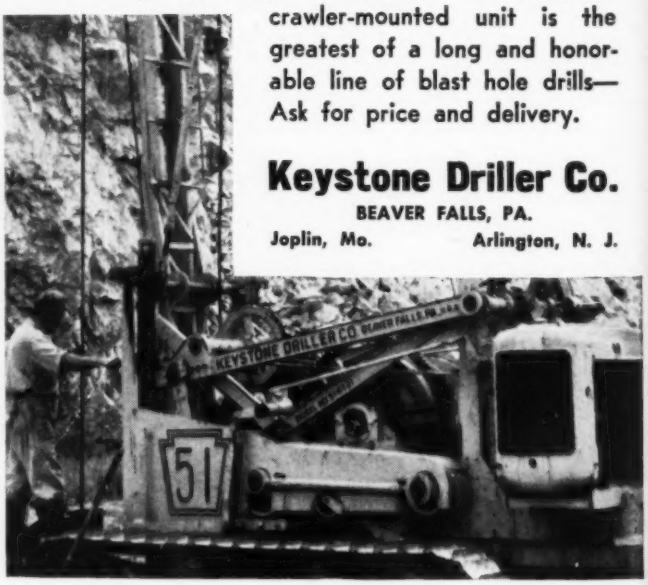

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Warner Company Plant Gets Improved Facilities for Handling Plastering Sand

By E. L. SHOEMAKER
Chief Engineer
The Warner Company

FOR a number of years it has been evident that the existing facilities for producing and handling plastering sand at our Van Sciver plant, were inadequate. In 1946 it was decided to improve them. At that time the facilities consisted of two sand drags which had previously been transferred from another plant. When installed at Van Sciver, they were considerably extended, so that the sand was dragged directly up onto a 2,000-ton pile. From the pile at the end of the drags it was taken by locomotive cranes and either loaded into cars or placed in a ground storage pile.

At Van Sciver plastering sand is bled off from the sand flumes through perforated launder plates and is dewatered by the sand drags. The drags did a good job of dewatering but were not sufficiently rugged to stand up, due in part, to the fact that they had been extended. Maintenance on the chain was costly and troublesome. A desirable feature of the installation, however, was the fact that the sand continued to dewater as it lay at the end of the drags until such time as it was moved by the cranes.

Excessive crane time was required to load cars and to transfer the sand to the stockpile. In order to secure an appreciable storage, it was necessary to rehandle the sand several times. Lastly, the track on which the cranes operated was simulaneously used for loading cars with crushed gravel, and the two operations conflicted.

In developing plans for revamping the facilities, many schemes were studied over a period of several months. One of the methods considered was to flume the plastering sand to a point on the other side of the spur track and there erect a substantial bucket elevator to dig from a generous settling pit and to discharge into an elevated bin over a new spur track. Other ideas were a system of conveyors to a stockpile over a tunnel and a slackline rig to stockpile and reclaim. Several models were made and observed. Finally, it was decided to proceed as follows.

The sand drags were reconstructed by using a much heavier chain, and the drives were completely renewed. The new chain is No. 847 Ley Bushed and runs over manganese steel sprockets and rollers which are considerably larger than formerly. The drive consists of a 25-hp. motor driving through a Link-Belt hydraulic coupling and a herringbone speed reducer to a final roller chain drive. The hydraulic drive was decided upon since we had experienced difficulty with the drags jamming and desired a slip point to overcome this trouble.

To move the dewatered sand from the pile at the end of the drags, it was decided to secure a large revolving crane with a working radius sufficient to feed an elevated storage bin and put the excess into a storage pile. Deliveries on new cranes were far in the future, and our attention was directed to WAA surplus. A number of WAA cranes were located close at hand, but we soon learned these had been "frozen". Eventually we went to the West Coast and purchased two R-20 American Revolvers from the war-time shipyard of the Permanante Corporation at Oakland, Calif. These were typical shipyard cranes on elevated gantry structures.

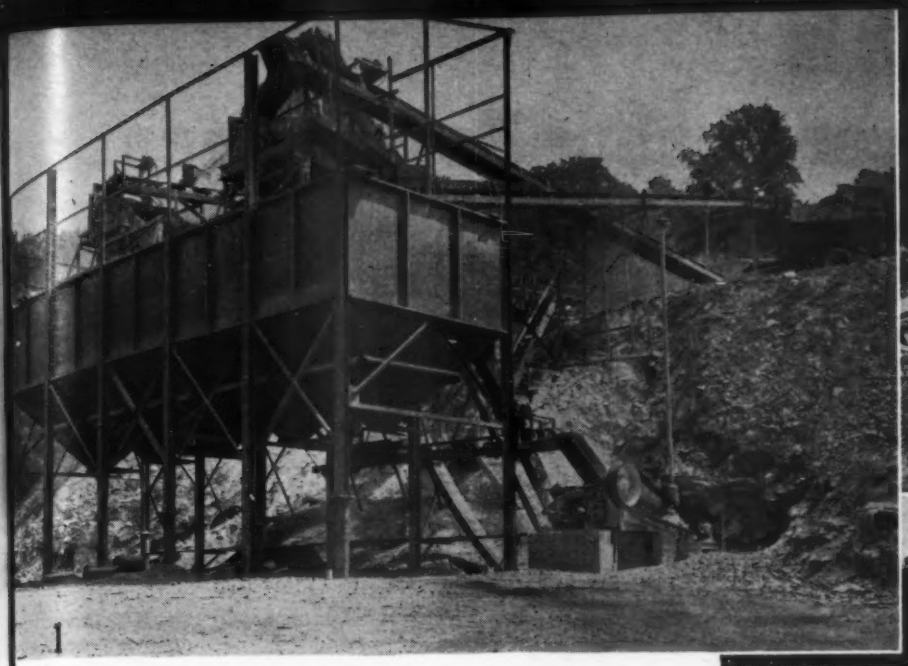
Then came the long process of dismantling the cranes, matchmarking for re-erection, and shipping them east *via* rail. Complete dismantling was necessary to reduce the cranes to pieces sufficiently small to be shipped. One of the cranes was re-erected at a retail distributing yard on the banks of the Schuylkill River at 51st Street, in Philadelphia, and the other was re-erected for handling the plastering sand at Van Sciver.

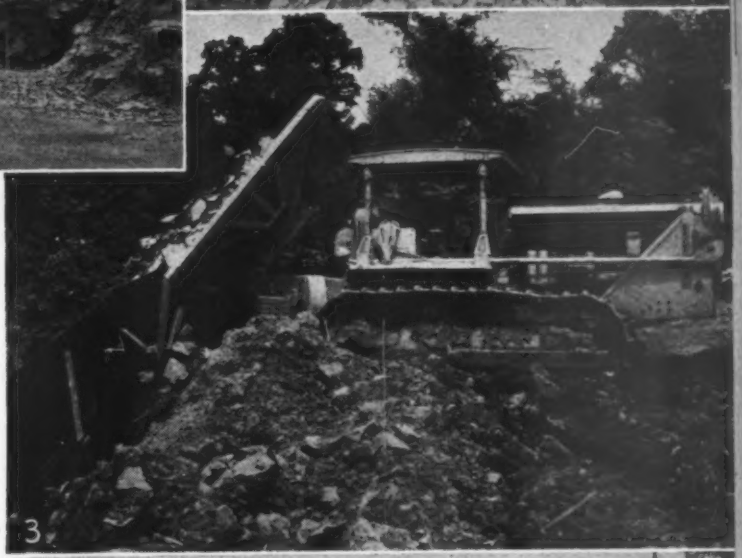
Since the cranes were fitted out for "lifting" at the shipyard, it was necessary to revamp them for clamshell operation. This consisted of removing the jib section of the boom and inserting an additional sheave so as to provide for holding and closing lines. Power lowering gave way to lowering on the brakes. As set up at Van Sciver, the R-20 operates at a maximum working radius of 110 feet and handles a 3-cu. yd. re-handling bucket. It can make a storage pile of some 50,000 tons, about 35,000 tons of which are directly recoverable. Future extension of the track is contemplated, thereby greatly increasing the storage.

Next, attention was given to the design and procurement of a large overhead storage bin which would hold 1,000 tons. This bin was to be located over a new spur track so as to divorce it from the operation of loading the crushed gravel. An all-welded design was chosen with three large discharge gates so located as to fill one of our company hopper cars without the necessity of shifting. In order to simplify the loading of the bin, the top was made as large and as low as possible. This led to the shape of a large inverted cone or "Dixie Cup". The diameter at the top is 46 feet, and the crane operator simply bails the sand into it without any necessity of carefully spotting his bucket.

The soil conditions at the bin site were unfavorable for the use of spread footings, and it was necessary to resort to the use of steel bearing piles, driven to a depth of 60 feet. These are capped with a steel grillage upon which rest the concrete pedestals and finally the bin structure. In practice it has been found that the bin will actually hold 1200 tons, or the equivalent of two 600-ton barge loads.

At our Van Sciver plant, shipments are made either by rail direct to the customer, or by company railroad to our loading wharf on the Delaware River for shipment to our own distributing yards in Philadelphia, Pa., and Wilmington, Del., and to customers in Camden, N. J., and Chester, Pa. The loading wharf is about six miles from the plant, and the track system at that point restricts our train length to eight hopper cars. Daily shipments are scheduled so that the rail shipment orders are filled in the morning, followed by shipments to the river thereafter. The storage capacity of the new bin now permits us to schedule the shipments of plastering sand to the river at such times as will least interfere with our other loading and shipping movements.





Camera Views of New Paul Garbart Quarry At Coolspring, Penna.

AS SEEN through the shutter of a camera, the Paul S. Garbart plant offers an interesting study in crushing operations. Equipment shown was installed at the site of the recently opened quarry at Coolspring, Penna., three miles southeast of Uniontown, where its owner, Paul E. Garbart is engaged in the contracting and coal stripping business.

Figure 1 is a general view of the crushing equipment, showing, in the upper background, the primary crusher and the belt conveyor system which carries stone to the vibrating screens atop the bins in the left foreground. A return belt carries over-size back to the primary crusher for recrushing. The roll crusher at the lower right further reduces stone to desired smaller sizes.

A Caterpillar diesel tractor hauling an Athey 16-cu. yd. side-dump quarry trailer (Figure 2) is transporting rock from the quarry to the site of crushing operations.

In Figure 3, the quarry trailer is unloading into the grizzly-type hopper which feeds the primary crusher.

Figure 4 shows the primary jaw crusher which is powered by a Caterpillar D17000 diesel engine. The quarry trailer in the back-ground is unloading into the grizzly-type hopper from which the crusher is fed.

The New Holland corrugated roll crusher in Figure 5, used for secondary crushing, is powered by a Caterpillar D8800 diesel engine. The belt conveyor system which handles oversize for recrushing is also powered by this diesel engine.

Report on Current Labor Developments

When the Government Will Halt Picketing

TWO recent decisions—one by the National Labor Relations Board and the other by the Circuit Court—have done much to clarify when peaceful picketing will be

By S. HERBERT UNTERBERGER

Director of Research
Labor Relations Information Bureau
Washington, D. C.

stopped by the action of the federal government. Picketing involving violence has always been preventable by an exercise of local police power.

Unless reversed by the Supreme Court (an action that seems unlikely), picketing in support of a strike to force an employer to engage in a boycott will be halted. This is because the Taft-Hartley Act for the first time established certain unfair labor practices of which unions could be guilty, and one of these is engaging in or encouraging such a strike.

Under the Taft-Hartley Act, when a union is charged with such an unfair labor practice, the NLRB must make a preliminary investigation forthwith. If the investigation gives the NLRB regional attorney reasonable cause to believe that the charge is true, he must ask the court for an injunction against the strike until the NLRB has finally adjudicated the matter. Seventeen such injunctions were requested and 11 were granted in the first ten months of the operation under the Taft-Hartley Act. If the NLRB finds the union guilty of the unfair labor practice, it issues a "cease and desist" order which is enforceable by court action.

Even if the Taft-Hartley Act is substantially amended in this session of Congress, causing an employer to engage in a secondary boycott will, no doubt, continue to be an unfair labor practice and therefore preventable.

Both the NLRB and the courts had a hard time justifying their action in banning such peaceful picketing. While the Taft-Hartley Act clearly stated that engaging in a strike for such an unlawful purpose was an unfair labor practice and thereby the picketing accompanying the strike became an unfair labor practice, which was similarly preventable, that Act also has a so-called free speech provision which provides that the expressing of any views, arguments or opinion cannot be either an unfair labor practice itself or evidence of one, if such expression contains no threat of reprisal or force or promise of benefit. So far, there does not seem to be anything inconsistent between these two provisions; but in 1940 the Supreme Court in a very important precedent-making case found that picketing is nothing more than a form of speech—the dissemination of a view. The legal problem now is clear. On the one hand picketing is an unfair labor practice, while on the other hand it cannot be an unfair labor practice because it is only an expression of free speech. Despite this apparent dilemma, both the NLRB and the Circuit Court reached the same conclusion, although by different reasoning processes — that peaceful picketing which encourages or induces a secondary boycott is illegal and may be prevented.

The facts in the two cases which called forth these rulings are as follows: The first involved the carpenters union and two building contractors who were being picketed because they were dealing with a manufacturer of prefabricated houses with whom the union was having a dispute. As a result of the picketing certain truck drivers refused to make deliveries and other employees refused to cross the picket line. The NLRB ordered the union to cease and desist from its activity.

In the other case the union followed the employer's trucks to loading docks and picketed them there. As a result, union dockworkers refused to unload the trucks. An injunction to prevent this activity was issued and the action was upheld by the Circuit Court of Appeals.

Court Rules NLRB Covers Whole Building Industry

Ever since the passage of the Wagner Act there has been an unresolved question as to whether all of the building construction industry was covered by the federal labor relations law. The Wagner Act, as well as the Taft-Hartley Act which succeeded it, covered all employers whose business "affects" (interstate) commerce. It must be recognized that this is about the broadest area that can be covered by stretching the regulation of interstate commerce authority as far as it will go. Nevertheless, the question of whether a relatively small building construction contractor whose operations were principally local was covered was never fully decided. The principal reason for this was that although the National Labor Relations Board appeared to have some authority in the field of building construction it preferred not to exercise this power. Neither the employers nor the unions were anxious to have this authority exercised, and so no test ever took place.

The Taft-Hartley Act, however, by dealing specifically with certain matters which were particularly characteristic of the building construction industry, such as jurisdictional disputes and secondary boycotts, made it very clear that it was now the intention of Congress that the NLRB concern itself with the building construction industry. The Board and its general counsel have done just that. Nevertheless, how far down into the industry to go was still a question. The General Counsel, who believes that the law requires the widest application, could visualize practically no exemptions. The NLRB itself was less anxious to assert its jurisdiction over the myriad small contractors in this industry.

The question, however, seems to have been pretty well settled by the U. S. Court of Appeals. The court ruled that an electrical subcontractor, a Pennsylvania firm working for a general contractor, also a Pennsylvania firm building a theater for a Pennsylvania company, was nevertheless, engaged in a business which "affected" (interstate) commerce and was, therefore, covered by the law. The principal facts relied on to support this conclusion were (1) that more than one-third of the materials used on the project came from out-of-state sources and (2) that the building industry is a ten-billion-dollar industry.

The court stated "that the total effect of a ten-billion-dollar industry on interstate commerce is obviously very appreciable" and that "Congress may, through its power to regulate interstate commerce regulate labor practices in industries which are themselves dependent on interstate commerce".

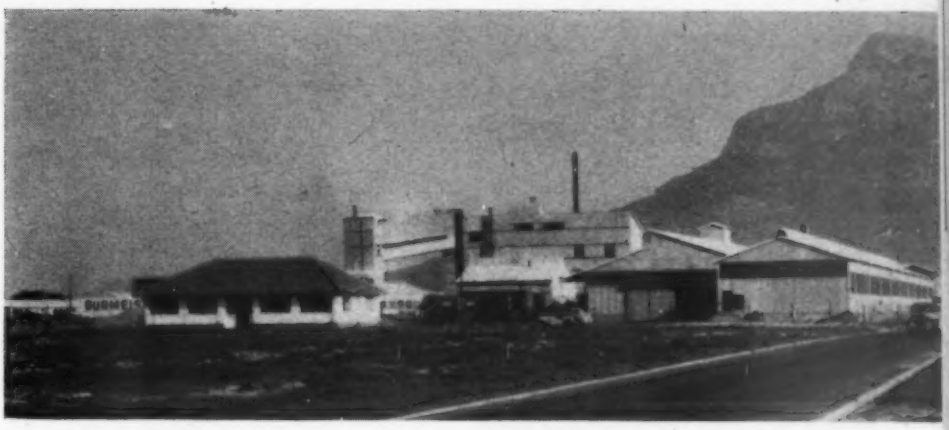
Even though the legality of the NLRB's jurisdiction over the smallest building contractor has been established, this does not necessarily mean that it is going to exercise that

(*Continued on page* 157)

Modern Cape Town Plant Supplies African Coast Cities with Wallboard

AN almost irrefutable testimonial to the growing industrialization of Africa is the swelling demand in that continent for construction materials. In an effort to fill this demand Gypsum Industries, Ltd., has built a new gypsum wallboard factory in the Parraden Eiland section of Cape Town, South Africa. This factory, which is the first of its kind to be built on the African continent, is said to be one of the most modern production plants of its kind anywhere in the world. In addition to the wallboard factory, the management has constructed a modern calcining plant on the same site with a rated capacity of 100 tons every 24 hours. The modern port equipment of the Cape Town harbor affords excellent facilities for shipping the finished products to markets all along the east coast of Africa.

All raw material is shipped to the mill by rail from quarries located about 200 miles away. A drag bucket reclaims the rock from the factory stockpiles and feeds the stone to the crushers. From the crushers the stone goes to a pebble-size storage bin via a bucket elevator and conveyor belt and then to a No. 5048 low-side Raymond mill, where it is ground and pneumatically classified to a fineness of 85 percent passing 100-mesh and elevated to the kettle storage bins. A screw conveyor on the under side of this bin feeds the material to the calcining kettle.



• A general view of the facilities of Gypsum Industries, Ltd., in the Parraden Eiland section of Cape Town, South Africa. In the background can be seen the famed Table Mountain.

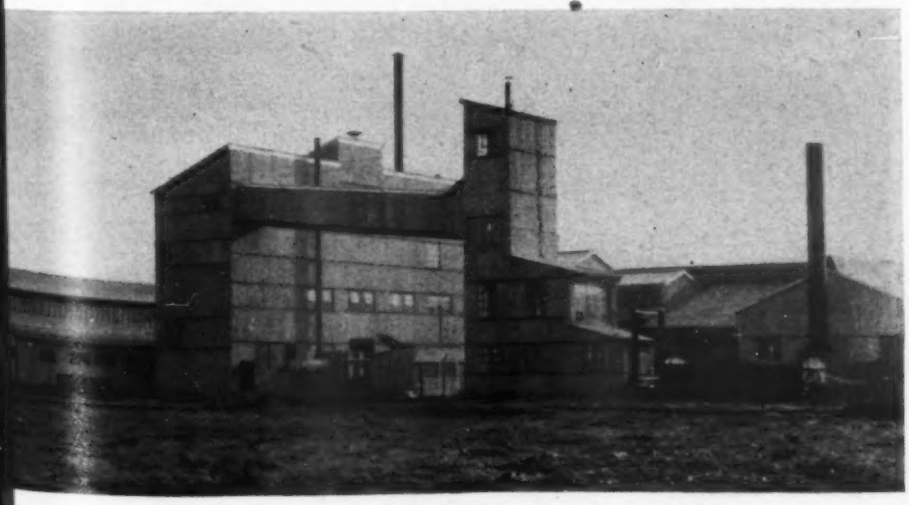
Calcination is completed in two-hour cycles, the kettles being equipped with new self-emptying insulated hot pits which receive the batches after calcination. The hot pits permit the calcined material to cool and complete the calcination of particles that may not have been completely calcinated in the kettle.

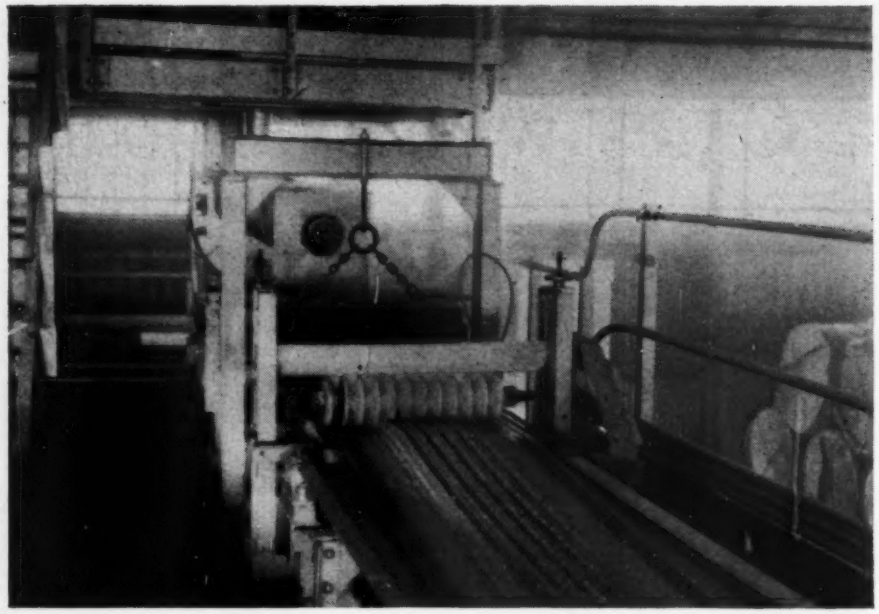
From the hot pits the calcined gypsum (stucco in trade parlance) is carried by a screw conveyor to the main storage bin located inside the wallboard plant. This bin has two drag chains, one to supply plaster for the wallboard operation, the other to provide material for the wall plaster operation. This latter chain discharges the material into the boot of a bucket elevator where the material is raised to a smaller storage bin mounted over an Ehrsam weigh hopper, which is used to charge a double-barrel mixer of the same make. Fibre is added to the stucco in the mixer and after thorough mixing the material is sent to a St. Regis packer for bagging as wall plaster.

The bulk of the calcined material however, is used for the production of plasterboard. The amount of material required for the manufacture of wallboard is drawn from the bottom of the main storage bin by means of a drag chain powered by a variable speed d.-c. motor with a speed range of 4 to 1. With this arrangement, any varying amount of stucco may be drawn from the bin. The drag chain discharges into a bucket elevator and the material is raised to a level above the soak belt and discharged into a screw conveyor over which are mounted specially designed starch and retarder feeders. Here the starch and retarder are mixed with the plaster before delivering it to the soak belt.

The soak belt is 24 in. wide and the water trough is 50 ft. in length. As the plaster is deposited on the soak belt it is spread evenly by a plow and passed under a suspended magnet which removes any tramp iron that may have fallen into the mix. From here the material passes through flute rolls in such a manner that the greatest possible surface area is exposed to the soaking. A specially-designed float valve maintains the water at a constant level in the trough. The soak belt discharges directly into a wet plaster mixer which is driven by two independent drives, one for the propeller and the other for the scraper. Dur-

• Looking toward the calcining plant, which has a rated capacity of 100 tons per 24-hour day.





• Material passes from the 24-in. soak belt (foreground) through the flute rolls (background) so as to expose the maximum area to the soaking. This belt discharges directly to a wet plaster mixer.

ing mixing, a special foam preparation is added to the mix in order to secure a lighter and better board.

The mixed plaster is spread on the bottom paper which has been previously grooved with scoring stones to form the edges of the board. The top paper is applied at the forming rolls where buffing wheels grind it to a feather edge and specially-designed glue wheels apply the silicate.

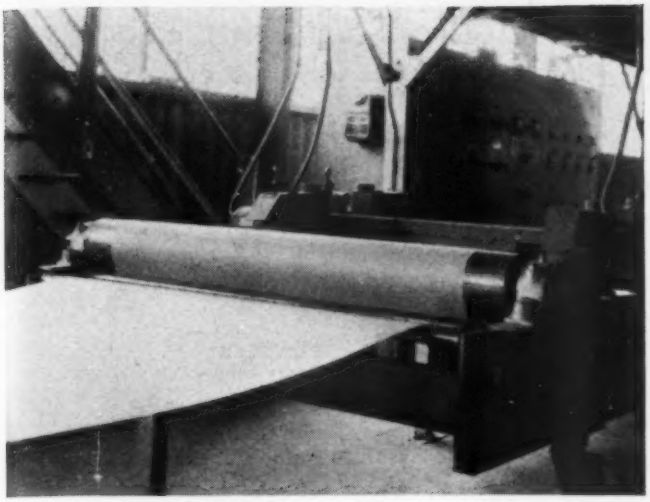
The forming rolls extrude the endless ribbon of board on two 100-ft.-long rubber belt conveyor tables and from there the board travels on an open table to an Ehrsam rotary cut-off machine, similar to those used in most American factories. Each of the belt tables, the forming rolls, and the cutter is driven by a d.-c. motor with a speed range of 4 to 1.

All drives are synchronized with each other and their speeds are regulated by means of an armature voltage control so that one operator may increase or decrease the speed of the synchronized motors by merely turning the main speed selector knob. The starting and stopping controls for all motors, from the plaster bin through the cutter, are located on the main control panel conveniently placed near the forming rolls. From this panel all motors can be started or stopped in groups or individually. All motors are electrically interlocked so that if one motor trips out because of an overload all other motors in the continuous process will stop, activating a green light on the control panel which indicates what particular motor has quit running. In addition, red lights on the cabinet indicate which motors are running and give the operator a visual check on all operations.

Scuffing of the board is prevented by making the speed rolls out of stainless steel. As the cut board passes onto the transfer table it breaks the beam of a photo-electric cell which stops the speed roll table and starts the transfer moving through its cycle of operation. The transfer table is built to accommodate boards up to 16 ft. in length and is completely automatic. Push-button operation permits handling of lath and standard sizes of wallboard, receiving them from the speed roll table, transferring them in steps across the width of the table, sorting the board into six streams of lath (if lath is being made) or three streams of wallboard (if wallboard 36 in. wide is being made) or two streams of wallboard (if 48 in. wide sizes are being made), and then automatically feeding it onto the tipple for delivery into the Coe drier. The feeding table is of the latest Coe design, feeding the six decks of the drier automatically. The control panel, on which are mounted all the starters and relays for the operation of the speed table, transfer and tipple, has been specially designed to as to concentrate all controls at one point.

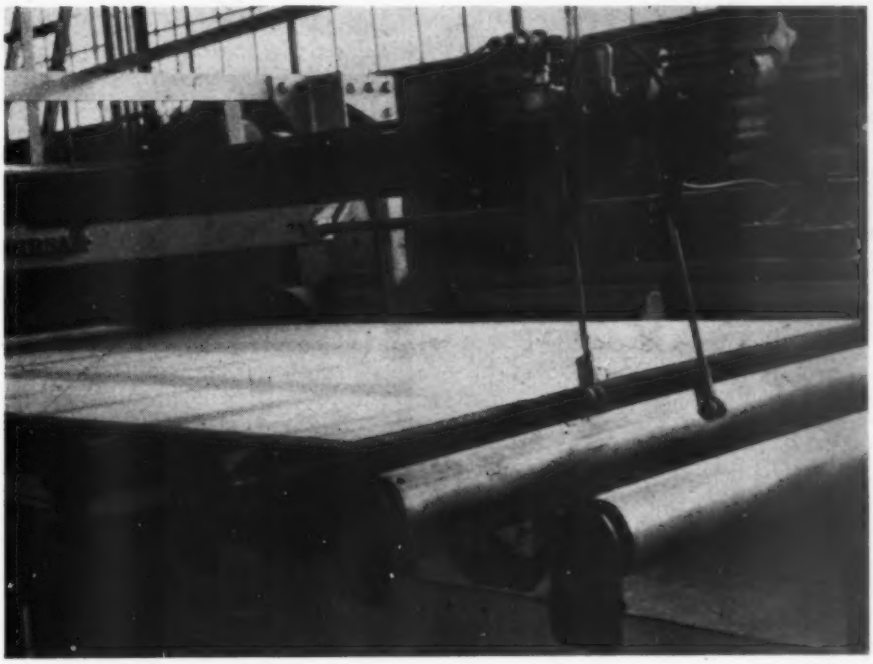
The Coe drier is built up of six decks with rolls 10 ft. long. The unit will receive six streams of 16-in. width lath, two widths of 48-in board or three widths of 36-in. wide board. The drier consists of a 16-ft. feed section, 3-ft. seal section, 78 ft. of enclosed sections and a 16-ft. cooling section. The enclosed sections are divided into two zones, each zone having its own independent air recirculating system and its own steam supply and temperature controls. The drier is anchored at four points with special rollers under the uprights of the steel frame, to allow for uniform movement of the structure caused by temperature changes. Three inches of insulation is placed between the sheet metal faces of the driers, doors and panels. Automatic temperature recorders and temperature controllers give both visual and a written record of the temperature in the two zones of the drier. A Coe re-cut knife of the guillotine type permits the company to manufac-

• One of the two 100-ft. rubber belt conveyor tables. These are driven by d.-c. motors with a speed range of 4 to 1.



• In the foreground is a paper tightener; in the right background, the control panel for all the synchronized motors.

• A view of the discharge end of the six-deck drier, anchored with rollers to compensate for movement caused by temperature changes.



• Right: A closeup of wallboard hitting the trips which actuate the cut-off machine.

ture boards of any special type and size required by their customers.

The factory at Cape Town is now producing lath as a base for plaster, square-edge and tongue and-groove wallboard, and recessed-edge wallboard used for making an invisible joint wall. The wallboard may be made in widths up to 48 in., and in lengths ranging from 4 to 16 ft., and in thickness varying from ¼ in. to ¾ in. Lath is made in sizes up to 16 in. wide, with lengths of 4 ft. and a thickness of ⅜ in.

Machinery for the entire plant was supplied by the United States Wallboard Machinery Company of New York City, with a guarantee that it would produce 50,000 sq. ft. of board in 24 hours. Production records now indicate that the plant will consistently turn out around 75,000 sq. ft. every 24 hours. All electrical drives, conveying tables and transfers have been designed so that the plant capacity may be doubled without any alterations of existing machinery, with the single exception of the Coe drier, which would have to be lengthened.

The speed range of the electric motors is such that they can be used to produce three times the rated capacity. Ample space has been allowed in the layout for lengthening of the drier if and when demand warrants such a change.

Labor Developments

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jurisdiction in every case. This leaves employers engaged in the building construction industry or closely related to it in a state of uncertainty. They can not be sure whether certain of their labor practices are permitted or not.

A single example will illustrate the problem. A building contractor may have been checking off dues for years and he may have continued to do so after the effectuation of the Taft-Hartley Act, without requiring individual authorizations from each of his employees, as provided for in that law. If the NLRB prefers not to assume jurisdiction over him, he has no problem. But if for some reason the NLRB takes such jurisdiction, he can be guilty of a violation subject to all the penalties of the law. In view of that situation, it is usually sound advice to observe the federal law as fully as possible, even though some doubt may exist as to its specific applicability.

Highlights of Proposed Wage & Hour Amendments

The Labor Committee of the House of Representatives has reported out a bill providing for amendments to the Fair Labor Standards Act, more generally known as the Wage & Hour Law. Many provisions refer to specific industries and situations. Of major interest to the pit and quarry industries will be the following proposals:

1. Coverage of the act would be expanded to include *all employees of employers* engaged in interstate commerce. At present only those employees engaged in interstate commerce are covered. This frequently requires unequal treat-

(*Continued on page* 160)

New Lightweight Aggregate

Updraft Sintering Process Expands Waste Shale From Anthracite Mines

another ON THE SPOT report

A NEW lightweight aggregate of outstanding quality is now being produced and marketed by the Lehigh Materials Co. at a plant located near Lansford, Pa. The material is called Lelite, and the producing company is a wholly-owned

By WILLIAM M. AVERY

subsidiary of the Lehigh Navigation Coal Co., which operates a number of anthracite mines and coal preparation plants in the Lansford area.

In the unique updraft sintering process developed and patented by Lehigh, the lightweight material is produced by expanding metamorphic, carbonaceous shale, which is mined along with anthracite coal in the parent company's extensive mining operations. The shale used in the production of Lelite is a selected product from sizing and concentrating equipment in the modern coal preparation plants operated in the vicinity of the Lelite plant.

Special chutes and conveyors at the preparation plants take off the desired raw material into storage bunkers. From these, the shale is transported to the Lelite plant by railroad in hopper-bottom cars, further controlled by blending, and put into a large storage pile by means of a trestle conveyor 40 ft. high by some 340 ft. in length. A reclaiming belt conveyor in a tunnel under the storage area is used to feed the furnace plant. To initiate the bloating process in the furnaces, an ignition mixture, made by blending shale and coal, is used; this is stored in a separate pile over the reclaiming tunnel.

Under normal conditions the Lelite plant, which runs on a continuous cycle, uses only raw material produced in current operation of the preparation plants. Facilities for handling raw material have been so arranged that the furnace feed bunkers can be supplied directly from current shipments, or from the storage piles, the latter having sufficient capacity for 30 days' full-scale operation in the event of interruption of shipments.

The three sintering furnaces are of special design, incorporating 12- by 48-ft. Coxe-Lloyd type endless traveling grates which are said to be the longest of their kind ever built. Draft for each furnace is supplied by a Buffalo Size 8 blast fan driven by a 75-hp. Westinghouse steam turbine. These turbines and similar prime movers used throughout the plant utilize steam supplied by type VU waste-heat boilers.

The ignition material is fed from a hopper at a uniform rate onto the front end of each grate. The slow-moving grate conveys this shallow bed of material into an ignition chamber, where it is kindled. Just beyond this chamber the shale is fed from a second hopper to build up a uniform bed of raw material on top of the blend of anthracite coal and

• An inclined conveyor feeds the semi-finished Lelite from the primary crusher into the grading plant, where it can be further processed for shipping or stockpiling by the trestle conveyor at the left.

• A general view of the Lelite lightweight aggregate plant of the Lehigh Materials Co., Lansford, Pa. The building in the left background is the grading plant, with the furnace building to the right. Raw materials are stored under the trestle conveyor at the right, semi-finished Lelite at far left.

shale. Combustion of the carbonaceous matter contained in both the ignition material and the raw shale brings the temperature in the bed up to approximately 2,800 deg. F., at which temperature the carbonaceous content and certain other constituents of the shale are driven off as gases.

The intense heat brings the shale particles to a pasty state just short of actual fusion, and in this condition. The bloating or expansion of individual particles is brought about by the action of the gases. The production of a uniform, high-quality sinter is insured by an elaborate system of temperature recording and control devices installed at numerous points in the furnaces. Rigid control of the updraft employed in the Lelite process is made possible by the use of a blast fan and an induced draft fan on each furnace.

The sinter emerges from the rear of the furnaces as continuous cakes or slabs approximately 12 ft. in width and 5 or 6 in. in depth. The slabs are broken into lumps by means of a rotating shaft which has projecting arms welded to it (see cut). A conveyor discharges the lumps of sintered material into a primary roll crusher in which the product is reduced to minus 2½ in.

The product, which is actually semi-finished Lelite at this point, is elevated by an inclined conveyor and distributed over a reclaiming tunnel by means of a trestle-conveyor. A tunnel belt conveyor and elevator system similar to that used for handling raw material feeds the sinter into a grading plant in which the final processing is carried out.

In the grading plant, Lelite is recrushed and screened to produce the various gradations specified for particular applications. Here there are two circuits, each with two double-roll crushers arranged in closed circuits with double-deck Link-Belt vibrating screens. The finished material drops from the various screen decks into nine storage bins which have a combined capacity of about 500 tons. Five of the bins are used exclusively for loading railroad cars, while the remainder, grouped on the opposite side of the grading plant, are used for loading trucks.

• Ignition material (a mixture of shale and anthracite coal) is fed to the grates from overhead bunkers.

Lelite is made in various sizes; typical gradings of two sizes are indicated in the following table, showing cumulative percentages retained:

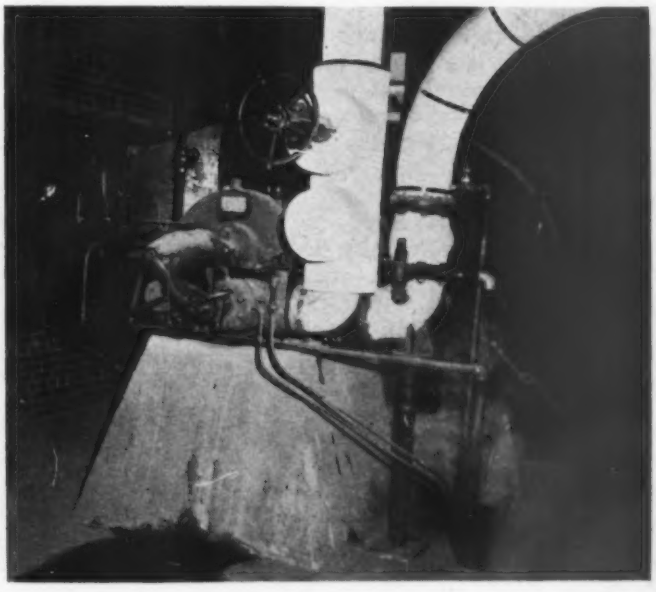
Tyler Sieve Size	No. 8 Sand	¾-in. Size
¾	0.0	0.0
(½)	0.0	(30.0)
⅜	0.0	50.0
No. 4	0.0	95.0
No. 8	0.5	96.0
No. 16	30.0	97.0
No. 30	60.0	98.0
No. 50	75.0	99.0
No. 100	85.0	100.0
(No. 200)	(92.0)	(100.0)

Using all except the bracketed figures, the Fineness Modulus for the No. 8 sand is 2.50, and for the ¾-in. material is 6.35. For structural concrete ranging from 2,000 to 4,000 p.s.i, an average recommended proportion is 55 percent No. 8 sand and 45 percent ¾-in. size by dry weight. In this range of strengths air-dried Lelite concrete weighs from 90 to 100 lbs. per cu. ft. The No. 8 sand in a loose, dry condition weighs approximately 62 lbs. per cu. ft., and the coarse material runs close to 40 lbs. per cu. ft.

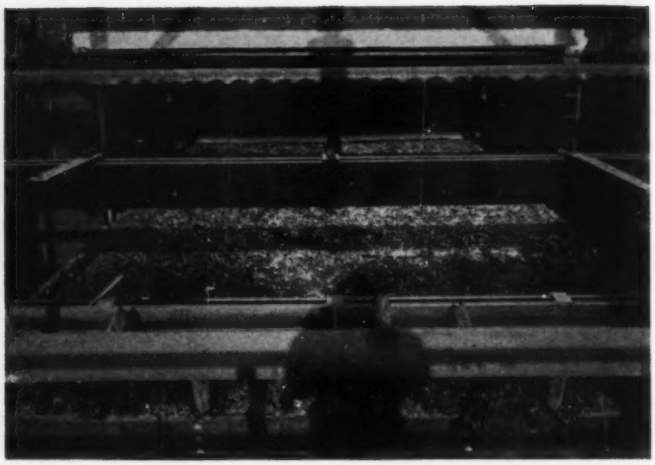
According to the manufacturer Lelite meets all requirements of A.S.T.M. *Standard Specifications for Lightweight Aggregates for Concrete*. Its chemically inert composition is such that it will not cause corrosion of reinforcing or other metals placed in concrete. Because of its cellular, vitrified make-up, it has excellent insulating properties, and the high temperature at which it is produced makes it a prime refractory material. In the proportion most commonly used, the absorption of Lelite aggregate is about 6½ percent, and for this reason it is recommended that the materials be prewetted. (It will be noted that the absorption figure of 6½ percent is on a weight basis; if this were to be compared with the absorption figures for heavy aggregates, the figure would be around 3¼ percent.) This prewetting—about 5 percent—is desirable to avoid segregation and absorption of the mixing water. However, in using Lelite, it is not necessary to add most of the mixing water before adding the cement, as is recommended for some aggre-

• The blast fan on one of the furnaces. Steam for the 75-hp. turbine drive is supplied by waste heat boilers.

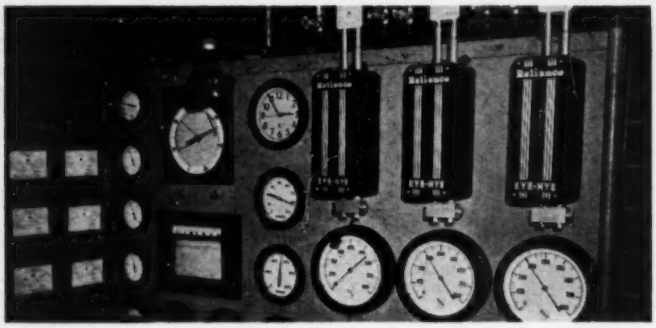
• The front end of one of the updraft sintering furnaces. Coxe-Lloyd type endless grates are 12 ft. wide by 48 ft. long. These are said to be the longest of their type ever built.



• Right: Sinter emerges from the rear of the furnaces as a continuous cake or slab; it is broken into large lumps by breaker arms mounted on the shaft in the foreground.



• Below: Some of the temperature recording and control devices which insure the production of uniform sinter.



• Right: A view of the car-loading station under the grading plant. Five bins on this side hold 300 tons of finished product. Trucks are loaded from four bins located on the opposite side of the plant.

• Below: One of the double-deck vibrating screens used for final grading of the material.

gates. In using Lelite, all of the materials—cement, fine aggregate, coarse aggregate, and mixing water—can be put into the mixer in the same manner as when natural heavy aggregates are used.

Lelite is the result of exhaustive investigations carried out over a period of years by the Lehigh Navigation Coal Co. In 1943 a pilot plant was built at Lansford and operated for about two years while the technique of the process was developed and perfected. Not until the company's engineers were fully satisfied that a top quality lightweight aggregate could be produced, were steps taken to construct a commercial plant. The subsidiary Lehigh Materials Company was organized just to produce and market Lelite.

Handling facilities in the plant are based on maximum production with three furnaces of about 360 tons per day. With the present acute shortage of lightweight aggregates, full utilization of this output is a foregone conclusion. Producers of precast concrete products within reasonable shipping distance of the plant have already indicated a strong preference for the new material. The Lelite plant in all probability represents the largest single investment ever made for the production of lightweight aggregate, and in respect to capacity it easily tops any similar operation with which we are familiar.

John L. G. Weysser is manager of Lehigh Materials Co., A. T. Beckwith is superintendent of the Lelite plant, and A. T. Rogers, long associated with the cement industry, is manager of sales engineering and promotion, with offices at 143 Liberty St., New York City.

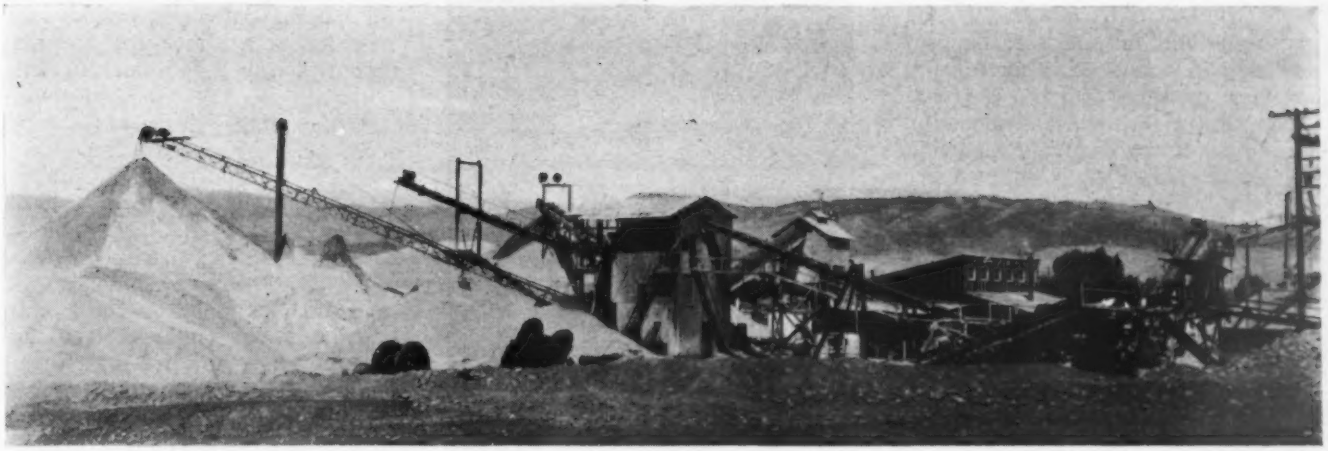
Labor Developments

(*From page* 157)

ment where some employees of a particular employer are engaged in interstate commerce while others are not. Under the proposed amendment, if any employees are engaged in interstate commerce, they would all be treated alike.

2. The minimum wage would be increased from 40 to 75 cents.
3. Certain payments would be specifically excluded from an employee's regular rate of pay used in figuring overtime compensation. They are: gifts; payments for hours when no work is performed; travel expenses; discretionary bonuses; irrevocable contributions to welfare plans; premium pay for hours worked in excess of 8 per day, 40 per week or the employee's normal working hours; premium pay of not less than 150 percent of the base rate for work on Saturdays, Sundays, holidays, regular days of rest or the sixth or seventh day in a work week, or outside the straight time hours specified in an employment contract.
4. The statute of limitations is to be extended from 2 to 4 years.
5. The Secretary of Labor would have rule-making authority, so that conforming to a ruling from him would prevent any further liability. At present an employer may be conforming with a ruling of the Wage-Hour Administration and may, nevertheless, be liable

(*Continued on page* 162)



• A general view of the Chaussee-Swan Gravel Company's plant at Boise, Idaho, which has a capacity of 100 tons of specification aggregates per hour.

Boise River Supplies Chaussee-Swan With Permanent Source of Material

another ON THE SPOT report

By HARRY F. UTLEY

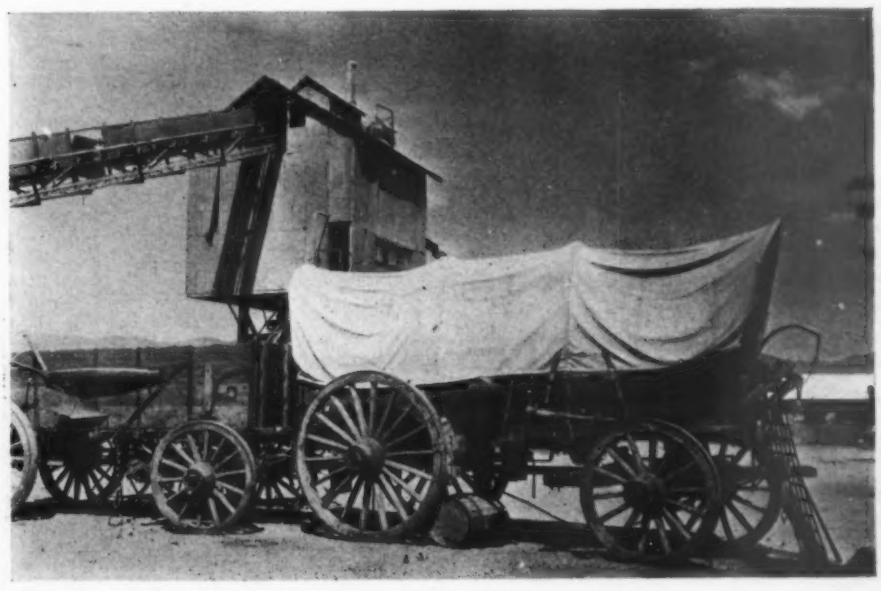
TWO Idahoans, widely experienced supervisors of heavy engineering construction with the firm of Morrison-Knudson Company — A. J. Chaussee and J. M. Swan — have in the space of a few short years since the close of the war established themselves as the leading suppliers of aggregates and ready-mixed concrete in the Idaho capital.

The Chausee-Swan Gravel Company plant at Boise has a producing capacity of 100 tons of specification aggregates per hour; and in addition it turns out a considerable tonnage of road gravel, and up to 250 cu. yd. of mixed concrete daily. Raw material is obtained from the bed of the Boise River only a short distance from the downtown section, the owners having acquired a 20-acre deposit when they resigned from the construction company to establish their new plant in 1945.

High-water conditions on the river in early spring constantly replenish the supply of good sand and gravel. Thus, a Northwest 80D Murphy-diesel dragline pulling a 2½-cu. yd. bucket is able to excavate and build up a 200,000-cu. yd. stockpile in a 60-day period after the water has receded, and this is sufficient to supply the requirements of the plant for an entire season. At the same time, the stockpile is built close enough to the primary crusher so that the raw material can be recovered easily with bulldozers. Simplification of the pit-to-plant transportation problem, together with the elimination of rehandling and circulating loads in the plant proper, are reflections of lesson learned by the owners in field construction work. These improvements have resulted in extremely low production costs which, if available for publication, would amaze most producers.

All crushing is accomplished as the initial operation by a Cedarapids 10- by 36-in. primary jaw followed by a set of 30- by 22-in. rolls. The dozers push the river-run material into a hopper supplying the primary crusher. The top size of material, usually 1¼-in., is thus attained at this early stage of the operations and no further crushing is done. A 2-deck 4- by 12-ft. vibrating screen makes the rough separation of the dry materials at the crushing plant, the top deck serving as a scalper with rejects passing back to the rolls in closed circuit.

The entire output of the crushing plant can be sent to a road-material storage pile, or to the washing-and-screening building, or the load may be split at the screen with one part going one direction and the remainder in the other. If roads material is being stocked, an 80-ft. stacker conveyor builds up storage



• A prairie schooner and a trailer, on display at the plant, belong to Mr. Chaussee's collection of old-time, horse-drawn vehicles.

over a 12- by 16-ft. steel and concrete truck-loading tunnel. If the crushing-plant output is to be processed for commercial aggregates, another conveyor carries the material to the washing-and-screening building. Here, washing and sizing are accomplished by a high-capacity Seco triple-deck screen equipped with a full complement of high-pressure water jets on each deck. Material retained on each deck makes the three finished coarse aggregates: 1¼ to ⅝-in.; ⅝- to ⅜-in.; and ⅜- to 3/16-in.

The minus 3/16-in. "throughs" are further treated to make washed concrete sand, discharging first to a Smith settling tank, followed by a pair of screw classifiers acting as dewaterers.

The three sizes of gravel and one of sand are stockpiled by stacker conveyors radiating from the screening building, the finished aggregates being deposited in line above a long, 11-ft.-diameter reclaiming tunnel. Each of the five stacker conveyors —including the one handling unwashed road rock—has an elevated steel truck-loading bin alongside into which the material can be diverted from the belt if desired for direct loading into trucks without the need for stockpiling and recovery.

An 18-in. by 320-ft. belt conveyor operates in the tunnel and runs up to a batching plant, where the sized material is stored in a compartment bin for loading out or for batching into truck-mixers. The batch plant is equipped with a Johnson 2-cu. yd. weigh batcher and scales. Bulk cement is stored in a steel tank alongside. The truck-mixer fleet includes three 5-cu. yd. Rex units, two 3-cu. yd. Jaegers, and a 3-cu. yd. Ransome.

• The settling tank and the screw classifiers which make the concrete sand.

Gates on the reclaiming tunnel beneath the washed gravel and sand stockpiles are remote-controlled from the batch-plant floor, while those in the truck-loading tunnel under the road gravel storage are manually-operated by the drivers. A separate conveyor extends from the batch plant to two allied, but independently-owned and operated business ventures adjoining the plant, to keep them supplied with material without the necessity of trucking. One of these is the Campbell-Childs Brick Co., which produces concrete brick; the other is the Pneu-Crete Co. which does guniting and Colorcrete work.

The Chaussee-Swan company owns eight 5-cu. yd. dump trucks for making deliveries, besides its six truck-mixers. Pick-ups are made independently by numerous other trucks.

While the driveways usually teem with movement, the vehicles used for transportation of products do not entirely account for all the rolling stock in the yard. For Mr. Chaussee is an avid collector of horse-drawn vehicles of ancient vintage, such as stage coaches, prairie schooners, fire engines, flamboyant circus wagons and the like, several of which are permanently "garaged" in the yard. These old wagons are in frequent demand for parades, rodeos and fiestas, since the residents of Boise, like those of all typically Western cities and towns, love to participate in any festival reminiscent of the Old West. They are apt to cook up a celebration of one sort or another at the drop of a hat!

• Below, left: The road material stockpile and the truck-loading tunnel. The stacker conveyor and truck-loading bins are shown at the right.

• Right: Two of the truck mixers at the batching plant. The conveyor comes up from the reclaiming tunnel.

Labor Developments

(*Continued from page* 160)

for a violation of the law if that rule is overturned in the courts.

6. Employees who voluntarily settle claims under the supervision of the Secretary of Labor would be relieved of further liability. At present, even after such a settlement, they may be sued by individual claimants.

This bill will be debated in the House. Senate hearings on similar proposals did not begin until after this bill was reported out of Committee and, therefore, action in the Senate is likely to lag far behind House action.

The cement industry has used as much as 23 million pounds of explosives in a single year in its quarrying operations.

personal mention

The following appointments have been announced by officials of the Pennsylvania-Dixie Cement Corporation:

H. W. RICH has been made superintendent of the Northern Division; W. P. GANO was named chemical engineer; and L. C. HAWK is research director.

Mr. Rich has had a varied experience, having served as a representative of the Worthington Pump and Machinery Corporation in Peru, Chile, and Bolivia. Subsequently he became mine engineer of the United States Gypsum Company's Oakfield, N. Y., plant. Later assignments with the latter firm included acting superintendent of the wallboard department and quarry superintendent at the company's Genoa plant. Mr. Rich became associated with Penn-Dixie in 1941 as quarry superintendent. The following year he became superintendent of Plant No. 4, with supervision of the mill and quarry, a position he held until his recent promotion.

Mr. Gano, who will maintain headquarters in Nazareth, Pa., has been with Penn-Dixie since its inception, serving as assistant general manager of the Northern Division and later (since 1933) as general superintendent of the division. In earlier years he had been affiliated with the Edison Portland Cement Company, the Dexter Portland Cement Company, the Alsen Cement Company and (in 1908) the Pennsylvania Cement Company.

Mr. Hawk, who will also be located in Nazareth, has served as chief chemist of the Northern Division and manager of the research laboratory at Nazareth since 1926. Prior to that he was chief chemist of a predecessor concern, the Dexter Portland Cement Company.

DR. EDGAR REYNOLDS SMITH, chief of the Physical Chemistry Section of the National Bureau of Standards, has been awarded the 1948 Hillebrand Prize of the Washington Section of the American Chemical Society. Dr. Smith was cited for his "original work in physical chemistry, more especially contributions to electrochemistry and ebulliometry."

A. J. CAYIA, who has been associated with the Inland Lime and Stone Company for the last 21 years, was recently elected president of the firm. He had been vice-president and general manager since 1946.

Mr. Cayia joined Inland Lime and Stone in 1928, when he undertook to develop the quarry and construct the plant at Port Inland, near Manistique. Previously he had been associated with the M. A. Hanna Company in various capacities.

WILLIAM H. MILLS, formerly chief of the Airport Division of the Civil Aeronautics Administration at Atlanta, Ga., has been appointed district engineer in charge of The Asphalt Institute's newly-established office at Atlanta. Mr. Mills will supervise the territory covered by Georgia, Florida, Alabama, Mississippi, Louisiana and Tennessee—Division I of the Institute.

W. H. Mills

For 20 years Mr. Mills was associated with the South Carolina State Highway Department. During World War II he served with the U. S. Corps of Engineers. He is a member of the A.S.C.E., the A.S.T.M. and the South Carolina Society of Engineers.

B. L. SWETT, who retired as vice-president and Eastern sales manager of the Lehigh Portland Cement Co. on January 1, was given a testimonial dinner at the Lehigh Country Club at Allentown, Pa. Officers, directors, department heads and district sales managers of the company attended. John Bowen, Lehigh's executive vice-president, presented him with an inscribed watch as the gift of his associates.

Mr. Swett joined the sales staff in Indiana in 1908, becoming Eastern sales manager in 1912 and vice-president in 1926.

R. S. BRADLEY has been promoted to head a newly-created division as director of research and engineering at the A. P. Green Fire Brick Company in Mexico, Mo. Under this move all research and engineering functions, with the exception of sales engineering, will be under the administrative head of Mr. Bradley.

Mr. Bradley has been with the Green company since June, 1923, having seen the plant grow into one of the largest refractories plants in the world. He had been director of research at the Green company before his promotion.

CRIS DOBBINS, executive vice-president of the Ideal Cement Company, has been elected a director of the Denver National Bank.

JOHN HAY WHITNEY has been elected chairman of the board of directors of Freeport Sulphur Company. Mr. Whitney, senior member of the venture capital investment firm of J. H. Whitney & Company, has been a director of Freeport since 1930. He resumes the post of chairman of the board which he held from 1934 until 1942, when he resigned to enter the U. S. Army Air Force.

HARRIS N. SNYDER, vice-president and general manager of the Buffalo Slag Co. Inc., Buffalo, N. Y., has been re-elected vice-president of the Millard Fillmore Hospital.

LEROY T. BROWN, White Plains, N. Y., has been appointed general superintendent of the W. H. Loomis Talc Corporation, according to an announcement released by A. Prescott Loomis, treasurer and public relations officer.

Mr. Brown will be in charge of all the mining and milling operations of the three mines and three mills of the Loomis Talc Corporation. Company officials stated that the post was a new one for the Loomis concern.

LEONARD T. BEALE, president of the Pennsylvania Salt Manufacturing Company, was re-elected a member of the National Industrial Conference Board for the forthcoming year at the board's 32nd meeting held recently in New York. Founded in 1916 as an independent and non-profit institution for research and education in the fields of economics and business, the board is supported by nearly 3,000 business concerns, trade associations, labor unions, government bureaus, libraries, colleges and universities.

E. W. CAREY, a director of the United States Gypsum Company, has been named a vice-president of the firm, according to an announcement released on March 5.

GEORGE T. DOBBIE has been re-appointed chairman of the board of directors and president of Gypsum, Lime and Alabastine, Canada, Ltd.

Other officers elected are: vice-president, J. E. MCCONNELL; vice-president, C. GORDON COCKSHUTT; vice-president and managing director, P. P. TYLER. Directors include S. G. DIXON of Montreal, ROBERT A. BRYCE of Toronto and W. H. COOPER of Hamilton.

CHARLES A. FREEMAN has resigned from the A. P. Green Fire Brick Company to form his own company at Canyon City, Colo. The new corporation will acquire clay deposits, buildings and equipment now located at Canyon City.

Mr. Freeman was general manager of the A. P. Green Engineering & Management Company, having been connected with the Green organization in various sales and engineering capacities since 1928, during which time he was instrumental in developing the use of Missouri fire clays for blast furnace service.

The appointment of FRANCIS P. RICHARDSON to the newly-created position of assistant credit manager of the National Gypsum Company was recently announced by Walter S. Corrie, treasurer.

Mr. Richardson joined National in December, 1947, after three years with the U. S. Veterans Administration.

JOHN DOANE has been appointed traffic manager for the Calaveras Cement Company, with headquarters at 315 Montgomery Street, San Francisco, Calif.

Mr. Doane has been affiliated with Calaveras since January, 1948, when he became assistant traffic manager. The announcement of his promotion was released by H. C. Maginn, vice-president and chairman of the operating committee.

J. D. LEWIS, president of the American Sand and Gravel Company and associated companies of Hattiesburg, Miss., and a director of the National Sand and Gravel Association, has been elected a member of the board of directors of the Mississippi Power Company.

EDWARD REMBERT, vice-president of the United States Gypsum Company, was recently elected a member of the concern's board of directors. He succeeds to the post of A. F. King, who died last year.

obituaries

LEWIS R. FERGUSON, 68, a vice-president of the Lone Star Cement Corporation, Texas Division, died on February 23 at his home in Dallas. Mr. Ferguson was a past president of the American Society of Civil Engineers and a member of the American Society for Testing Materials.

In his earlier years Mr. Ferguson was associated with the Portland Cement Association in the capacity of an engineer. During World War I he was identified with the building of the first concrete ships. He joined Lone Star nearly 25 years ago.

ALFRED W. THORN, 85, retired president of the Thorn Cement Company, died on February 26 after a heart attack at his home in Buffalo, N. Y. Mr. Thorn came to Buffalo in 1889 and was a pioneer in the use of Portland cement construction.

Later he became associated with the Alpha Cement Company of New York and the Lehigh Portland Cement Company of Allentown, Pa. Ill health forced him to retire about 15 years ago. At that time he maintained offices for the Thorn Cement Company in Buffalo, Toronto and Montreal.

CHARLES F. CONNELLY, president of the Terre Haute Gravel Company, Terre Haute, Ind., died on January 26 in that city. He was 52 years of age. Although he had not been in good health for some time, he had not been acutely ill until a day before his passing.

JERRY STEVENS, 41, was killed when he slipped from a loaded truck of the Somerset Stone Co. of Lexington, Ky., and fell under the wheels. The truck was going down a steep grade and the brakes failed to function. The driver and another employee jumped to safety.

LEWIS H. ROSEBERRY, a retired designer of cement plants, died on March 17 in a hospital at Easton, Pa. He was 86 years of age.

VIRGIL M. VANCIL, an operating engineer at the Marquette Cement Manufacturing Company's Cape Girardeau plant, died unexpectedly of a heart ailment on February 25. He had been associated with Marquette for the last 28 years.

FRANK T. FITZGERALD, 41, president of the Amite Sand and Gravel Company, Baton Rouge, La., and his 8-year-old daughter Geraldine were killed in a motor accident near Alexandria, La., on March 12. Mrs. Fitzgerald and their son Frankie, aged 10, were critically injured in the accident.

JAMES F. MANNING JR., president of the Rockwood Alabama Stone Company of Russellville, Ala., died at his home on March 13. He was 56 years old.

M. JAMES RUGGIERO, president of the Acme Sand and Gravel Company of Lexington, Mass., died at his home in Watertown on March 11 at the age of 63 years.

MARRYL L. MCCARTHY, secretary-treasurer of the Rock Hill Quarries Company, died on February 27 of a heart ailment at a hospital in St. Louis, Mo. He was 51 years of age.

EDGAR L. SMITH, who had been president of the Alliance Sand Company, Inc., Northampton, Pa., at the time of his retirement a few months ago, died in a hospital in that city on March 3. He was 63 years of age.

KENNETH K. KUTZ, president and general manager of the J. P. Loomis Coal & Supply Company, Akron, O., died on March 26 at a Cleveland hospital at the age of 48 years.

Mr. Kutz had long been associated with the Cleveland Builders Supply Company and the Standard Portland Cement Division of the Diamond Alkali Company. He was also, at the time of his death, manager of the Akron Brick & Block Company, Mogadore, O., and the Darrowville sand plant north of Akron. The latter operation is owned by the J. P. Loomis Coal & Supply Company.

JUAN MARTINEZ, 33, an employee of the Fordyce Gravel Company, was smothered to death in a mishap at the firm's Victoria, Tex., plant. When the victim was pulled with several yards of gravel from the hopper into a waiting truck, a fellow worker tried to save his life by holding him, but was unable to do so.

HENRY W. CARSON, 74 years of age, who operated a stone quarry for many years at Slate Run, Pa., died on March 15 at Robert Packer Hospital, Sayre.

Building Research Board To Serve U.S. Housing Needs

The National Research Council recently announced that its new Building Research Advisory Board had met and organized itself into a non-partisan, fact-finding group for government, private industry and educational institutions. Its purpose is to help mobilize American research talent on a public service basis to produce facts aimed at providing housing for more people at lower cost.

The National Research Council is the operating agency of the National Academy of Science, an organization which has made notable contributions to national progress since 1863. The board will not directly engage in research activities, but will limit itself to presenting facts, based on the best available scientific information, according to Dr. Frank B. Jewett of Short Hills, N. J., chairman of the Building Research Advisory Board.

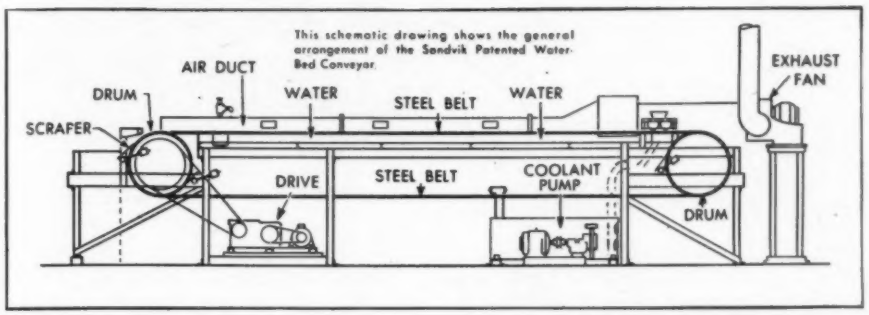
Union of S. Africa Plans To Produce Its Own Cement

The Union of South Africa has announced plans which would make that country completely self-sufficient in cement production by the close of 1949.

At present the Union is importing 300,000 tons of cement annually, but it is expected that the three new plants scheduled to be in production by July will cover all domestic needs.

The Lehigh Portland Cement Co., Louisville Cement Co., Certain-teed Products Corp., Federal Crushed Stone Corporation and National Gypsum Company were top honor winners in the Buffalo, N. Y., area in the annual accident prevention contest sponsored by Associated Industries of New York State.

new machinery and supplies



● Water-Cooled Conveyor

Sandvik Steel, Inc., New York, N. Y., has developed a new type of cooling conveyor which carries molten materials on a solid stainless steel belt that is actually supported by water.

The patented water-bed design assures 100 percent coolant contact with the underside of the steel belt. In operation, the top band of the continuous belt passes over a water bed formed by a series of tanks connected so as to form one continuous trough. When the conveyor is used for cooling, these tanks are usually filled with circulating water, although other coolants can be substituted if desired. When the unit is operating, the water pressure is just enough to raise the belt off its supports. The surplus water overflows into adjacent gutters, which collect and return it for recirculation.

● New Size of Electrode

The need for larger size diameter electrodes to handle heavy cast-iron castings has resulted in the development by Eutectic Welding Alloys Corporation, New York, of Eutectrode 24/49 in size ¼ in.

This new rod with special Frigidarc coating is particularly adaptable for overlaying and repairing large turbines, pumps, impellers, mixers, cylinder heads, housings, and other heavy types of castings requiring a heavier, more substantial electrode. Eutectrode 24/49 is also available in sizes 3/16 in., 5/32 in., ⅛ in. and 3/32 in. for all types of cold cast iron welding, requiring no preheating or dismantling of equipment. It is said to avoid any of the common dangers of overheating, distortion and warping of base metal. For use with either a.-c. or d.-c. machines, Eutectrode 24/49 reportedly has a uniform burn-off rate, flows out rapidly and produces welds with tensile strength of 50,000 p.s.i. and Brinell 150-200.

Eutectrode 24/49 gives a dense, smooth weld, free of porosity, with minimum amount of heat. It is recommended for all work in heavy industries, *e. g.*, rock and quarry equipment, etc. Eutectic Welding Alloys Corporation, 40 Worth Street, New York 13, N. Y.

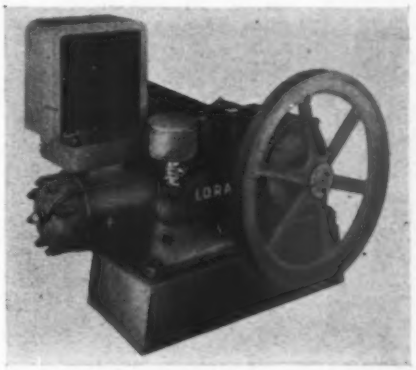
● Multi-Fuel Engine

White - Roth Machine Corporation, Lorain, O., announces the production of a new Lorain Type "O" single-cylinder, horizontal, two-cycle multi-fuel engine.

The new engine, manufactured as a companion power plant to the current Lorain Type "L", is rated at 34.3 hp. at 450 r.p.m. It has a 9½-in. bore and 10-in. stroke with Timken bearings on crankshaft and cross-shaft. Wet-sleeve type cylinder liners are of alloy cast iron, on location.

The engine may be operated as a cold starting full diesel or converted to burn natural gas or butane as fuel.

A condenser type cooling system eliminates the need for a water pump,



and makeup water is negligible. Standard equipment includes twin disc clutch Pierce governor, air maze oil-bath type cleaner, and McCord lubricator.

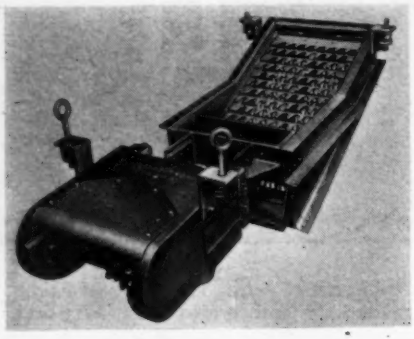
Lorain Type "O" over-all dimensions are as follows: height, 59-in.; length, 88-in.; width, 58-in. Shipping weight is 3800 lbs. (domestic) and 4500 lbs. (export).

Pictured above is the Landis S-343 side-dump semi-trailer recently developed by the Landis Steel Company, Picher, Okla. Here the 18-ton payload twin-hoist hydraulic unit is hauling material in the limestone quarry of the Anchor Stone and Materials Company, Tulsa, Okla.

● Vibrating Screens

Syntron Company, 375 Carson, Homer City, Pa., now has available a new line of vibrating screens for economical and efficient rough sizing.

They are made up with stepped, punched plates having tapered elongated

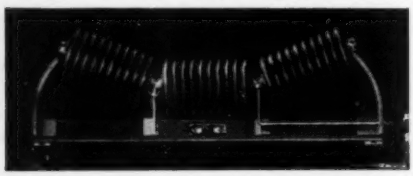


openings—the size of the latter depending upon material specifications. Single or multiple deck screen plates are furnished as desired (see illustration).

The screen area is activated by the Syntron "Vibra-Flow" vibrating motor featuring variable control of material flow. This provides a two-purpose piece of equipment, a vibrating screen and a rheostat-controlled vibratory feeder, for increasing the efficiency and capacity of crushers and fine grinders and to prevent damage to belt conveyors by allowing the finest to cushion the lumps.

● Impact Idlers

A new, patented rubber disc impact idler has been announced by the Industrial Division of Continental Gin Company, Birmingham 2, Ala. The device is made for troughed, flat and



return belts, and is interchangeable with practically all standard idlers now on the market.

The use of impact idlers under the loading points is said to reduce materially damage to the cover and carcass of the belt. When damage is minimized, the cost per ton of material handled is naturally reduced.

Continental is also announcing its new hollow-center rubber-tired impact idlers for heavier installations, as well as others designed to meet specific conditions. All idlers, regardless of the type, are equipped with anti-friction bearings.

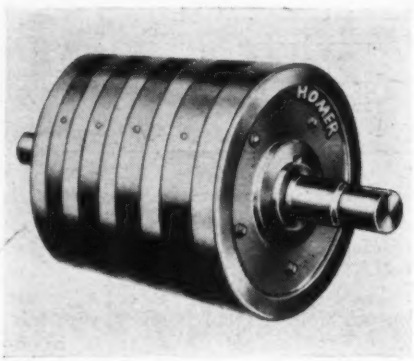
● Magnetic Separator

To compliment the line of Homer permanent magnetic separators, The Homer Manufacturing Co., Inc., Lima., O., announce the latest addition to this line—the Homer POWER-PLUS "non-electric" permanent magnetic pulley. These pulleys are designed to be used as either head-end pulleys or as idler pulleys in belt conveyor systems and are furnished in 57 standard sizes . . . in diameters of 12, 15, 18, 20, 24 and 30 in., with belt widths ranging from 4 in. to 60 in.

The POWER-PLUS pulley was designed especially for the separation of tramp metals from products of such industries as coal, quarry and cinder block manufacture and many others requiring thorough tramp metal extraction during or before processing.

Homer POWER-PLUS pulleys are crowned to prevent belt weaving and runout and to assist in equalizing the conveyed materials as it passes over the pulley. Standard or special length shafts are available to fit new or existing applications without changing bearings or shaft mountings. Head plates of Homer pulleys are cast aluminum, which eliminates the piling up of magnetic material on the outer edges of the pulley.

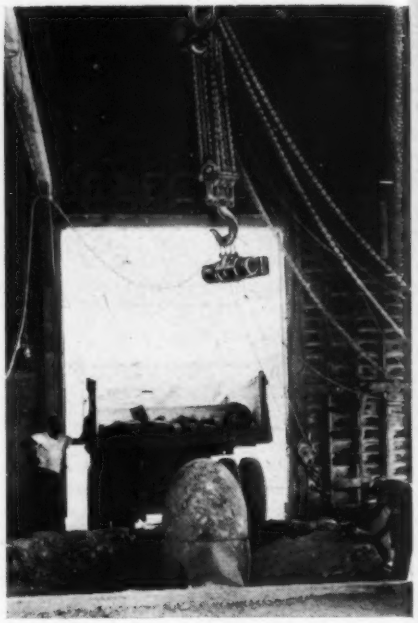
Homer POWER-PLUS magnetic separators are permanent and "non-electric."



They require no outside power source and are not affected by atmospheric or temperature changes; they can be applied to either indoor or outdoor applications without interference to the performance of the pulley.

● Electric Crusher Hoist

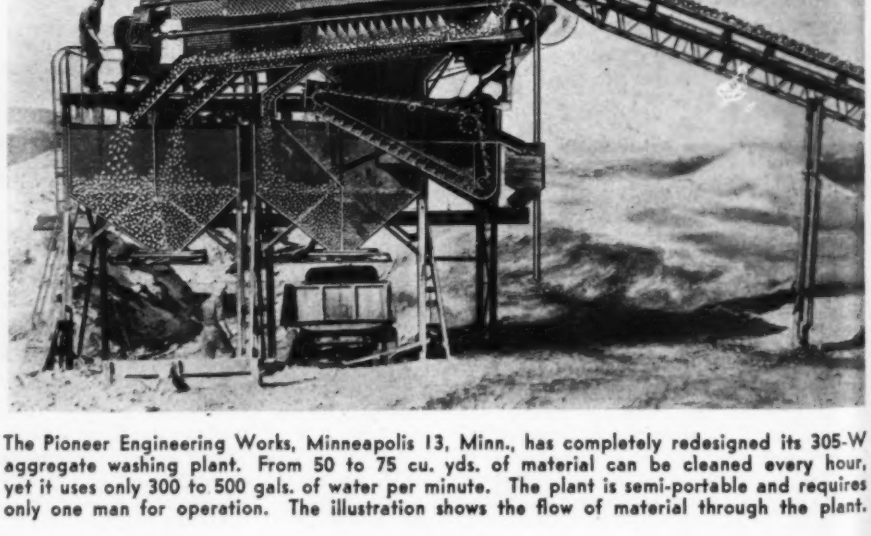
A solution to production delays caused by rock jamming in the crusher is now offered by Harnischfeger Corp., Milwaukee, Wis.



This is a P&H electric crusher hoist that hangs over the crusher. Equipped with accessory hook, the operator merely places this under the jammed rock and presses a button. The hoist lifts the side of the rock, and in it slides. This new method can save hours each day by sparing operators the slow, hard job of barring in wedged rock.

P&H electric quarry hoists are already in use by several quarries, and each reports unusual success and savings. Installation is reported to be extremely easy, with mounting on any overhead support. Operation of the hoist is simple, as it is equipped with a control panel that can be used at any point around the crusher. To raise the stone, the operator presses one button; to lower he presses another.

The use of wire rope, two brakes for greater safety, full magnetic push-button control, fully enclosed dust-proof construction and anti-friction bearings are other outstanding features.



The Pioneer Engineering Works, Minneapolis 13, Minn., has completely redesigned its 305-W aggregate washing plant. From 50 to 75 cu. yds. of material can be cleaned every hour, yet it uses only 300 to 500 gals. of water per minute. The plant is semi-portable and requires only one man for operation. The illustration shows the flow of material through the plant.

A front-end loader equipped with a standard ½-cu. yd. bucket has been announced by the Meili-Blumberg Corporation of New Holstein, Wis. A 1-cu. yd. bucket is also available. When in dumping position, the bucket has a clearance of 8 ft. 6 in. for easy loading of even highest dump trucks. One lever at the operator's seat provides complete remote control of pitch, raising, leveling, dumping, shaking and lowering of the bucket. Mounting of the loader, after the original installation, requires about 30 minutes.

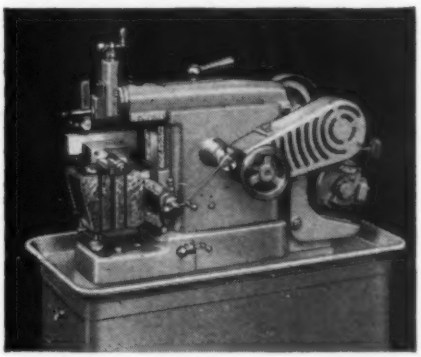
● Precision Bench Shaper

A new 7-in. bench shaper for toolroom and industrial use has been announced by the South Bend Lathe Works, 156 E. Madison Street, South Bend, Ind. Main castings for the shaper are made of close-grained semi-steel. The ram and table slides are milled and hand-scraped for precision fit and are provided with adjustable gibs. The bull gear shaft and countershaft revolve in Oilite bearings. All gears are machine cut from steel or gear fiber for smooth, quiet operation. Backlash is held to the minimum by fitting parts to extremely close tolerances.

The ram is 18 in. long and has ample bearing rigidity in all positions. Length of the ram stroke (0 to 7 in.) is adjusted by shifting the rocker arm shoe until the witness mark corresponds with the desired figure on the rocker arm. This adjustment is made with the crank shoe at the extreme top of its stroke. A large handwheel aids in making the adjustment. Cutting speed is variable from 3 to 114 f.p.m. Stroke rates of 42, 75, 120, and 195 per minute are obtained by shifting a V-belt on 4-step cone pulleys. A quick-acting belt tension release facilitates belt changes. Cutting position of tool is adjusted by releasing the rocker arm assembly lock on the ram.

The tool head has a 3-in. feed, swivels to any angle, and has a positive lock. A swivel clapper box allows tool clearance adjustments to be made. A clear-cut graduated collar on the feed screw reads in thousands of an inch. The tool post provided takes tools with shanks ⅜-in. by ⅞-in.

The work table is slotted on top and sides and has holes for attaching the vise and special work clamps in various positions. The table is equipped with an adjustable outboard support to the base. Reversible power cross-feeds for the table range from .002 in. to .016 in. per ram



stroke. A graduated plate indicates the feed. Horizontal table travel is 9½ in., vertical travel is 5 in., and maximum distance from table to ram is 5½ in. The vise has a graduated base and swivels to any angle. Vise jaws are 4 in. wide, 1 in. deep and open to 4 in.

A ⅓-h.p., 1725 r.p.m. motor is required for power and is mounted on a cradle attached to the back of the shaper.

● A.-C. Air-Break Starters

A high-voltage, combination fuse type air break motor controller developed by Westinghouse Electric Corp. provides complete motor and starter protection. These units may be used directly without further external protection on 3-phase, 50-60 cycle circuits capable of producing 150,000 kv.-a. at 2300 volts or 250,000 kv.-a. at 4160 volts. They can be applied with unity power factor synchronous motors rated up to 900 hp. at 2300 volts or 1500 hp. at 4160 volts, or 80 percent power factor synchronous and squirrel cage induction motors rated up to 700 hp. at 2300 volts and 1250 hp. at 4160 volts.

Basically the controller consists of a main contactor or contactors of the AH type with a thermal overload relay to provide normal starter functions, and type BAL current limiting fuses to protect the motor and starter against fault conditions exceeding the interrupting capacity of the contactor.

The new type AH, 3-pole magnetically operated contactor was developed to provide a rugged, air break type which would give long service under severe operating conditions with the minimum of maintenance. Rated at 200 amperes, 5000 volts, it has a normal life far exceeding that of the present day oil-immersed type and eliminates the problems of handling oil which are associated with oil-immersed equipment. Together with its thermal overload relay, it protects the motor against sustained overloads, locked rotor or stalled conditions, too frequent starting, undervoltage operation and fault conditions within its interrupting capacity.

Higher fault currents that might cause damage to the starter components are quickly limited and interrupted by the type BAL fuses. These fuses are co-ordinated with the controller components for a given application. The co-ordinated combination may be directly connected to a 3-phase, 50-60 cycle circuit capable of producing a short circuit current of 60,000-r.m.s. amperes first half cycle, including the d.-c. component, or 37,500-r.m.s. amperes on a symmetrical basis. Under maximum fault conditions the current is limited in ⅛ cycle and is completely interrupted in ½ cycle.

Main fuses can be incorporated so that several units may be mounted side by side and the group fed from a single source. Metering transformers and meters can also be provided.

● Loader Attachment

The new Model 3-A "Shoveloader" for mounting on the Case VAI tractor is announced by the Lull Manufacturing Company, 3612 East 44th Street, Minneapolis 6, Minn.

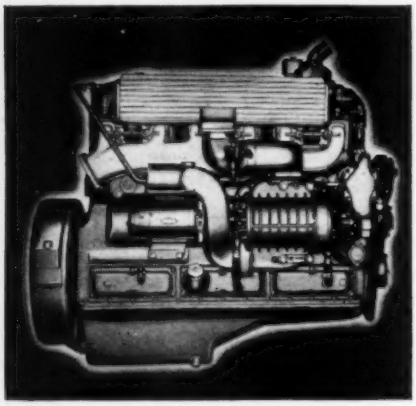
Outstanding features of the new Model 3-A include automatic "scooping-action," split-second or slow dump, and the unique design which keeps the load in balance and free from spillage after the bucket is filled.

The loader has a maximum lifting capacity of 1800 lbs. and can be equipped with either a ⅜-cu. yd. material bucket or a ¾-to-1-cu. yd. snow bucket.

● Supercharged Diesel

Production of a new supercharged Cummins diesel engine for industrial applications has been announced by Cummins Engine Company, Inc., Columbus, Ind. The newest addition to the Cummins line is designated Model HRBIS-600 and develops 225 hp. at 1800 r.p.m.

Model HRBIS-600 has a 5⅛-in bore



and a 6-in. stroke, with piston displacement of 743 cu. in. Like all Cummins diesels, it employs the four-stroke cycle principle of operation, and the exclusive Cummins fuel distribution and injection system.

Other mechanical features include standard two-valve heads, continuous groove main bearings, increased flow lubricating system, buttress-type oil pan and flywheel housing, a newly-designed lubricating oil cooler and a Roots-type blower.

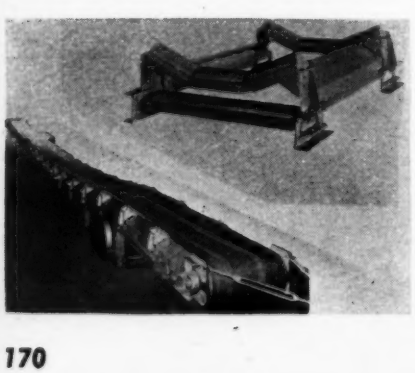
● New Conveyor Idler

In marketing their new "unitized" conveyor system, Transall, Inc., is emphasizing the merits and efficiency of the idler, which is the basic unit of all conveyors.

The Transall idler has precision ball bearings in each roller. These are lubricated with high-quality, non-oxidizing, non-emulsifying lubricant which retains its viscosity through a wide range of temperatures. This lubricant is sealed in; it does not throw out or cause damage to the belt. Relubrication is facilitated, but the original loading will last for years.

The combination of bearings and lubrication reportedly gives free turning rolls, less, wear, and lower starting movement. Troubles with "cold morning" starting are said to be eliminated, and less power is required.

Another feature is the resilient mounting of Neoprene which cushions each



roll, eliminating shock on the bearings, reducing vibration, and providing automatic self-alignment of bearings. The rolls are self-cleaning. The frame of the idler has a cleaning edge toward the roller, which removes any build-up of sticky materials greater than ¼ in. Idler mountings are of standard mounting widths and are available as individual idlers or assembled into their "unitized" sections.

In the conveyors as a whole, there are exclusive features such as these: minimum heights of head section, main chassis, and tail section; spill shields to protect the belt completely, replacing the conventional deck plates; compact drive and power unit; self-cleaning tail pulley; short, maneuverable, tail section; return idlers assembled in a composite unit with the troughing idlers, thus requiring no separate mounting structures for these return idlers.

The whole assembly, as well as its basic unit, were developed and are manufactured by Transall Incorporated, 109 North 11th Street, Birmingham 4, Ala.

● Air Impact Wrench

Heavy industries will find a valuable addition to their production and maintenance equipment in the new large-capacity air impact wrench developed by the Ingersoll-Rand Company. This wrench was designed to get heavy equipment back into service quickly by reducing the time required for repairs.

The Size 577 impact wrench is de-

signed to handle large studs, bolts, nuts, and cap screws from 1¼-in. up to 2-in. thread size. It operates on the rotary impact principle, by which motor torque is converted into 1000 powerful rotary impact blows per minute. This principle, which has proven its dependability in production and maintenance work, makes the machine ideal for running or removing large nuts. It is especially valuable for removing rusted or frozen nuts, and for drawing nuts and cap screws tight.

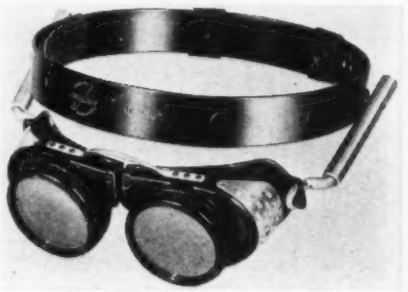
The 577 furnishes plenty of power for heavy work although it weighs only 72 lbs. (less socket), due to the extensive use of magnesium in the housings. Durability and ease of handling are other important features which facilitate its use.

● Headrest Goggles

Jackson's Headrest goggles No. W-50 have been improved to incorporate desirable features and comfort in welding, cutting and brazing.

Lenses, federal specifications, standard 50 mm. size, are available in shades 3 through 6. They are held in individual eye cups. Cover glasses protect the filter lenses from pitting.

The eye cups are of moulded plastic, joined together flexibly, so they may be easily fitted against the face of the wearer. The outside of each eye cup



has a ventilating screen and a baffle plate, which prevents fogging, yet keeps flying particles and stray light rays from reaching the wearer's eyes.

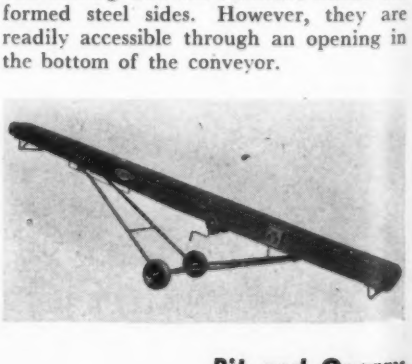
The goggle assembly is hinged from the sides of the headrest by telescopic arms. Concealed springs hold the goggles gently against the face. The headrest distributes the weight over the entire head. It is of light, plastic and easily adjusted to any head size. General Scientific Equipment Co., 2700 W. Huntingdon St., Philadelphia 32, Pa.

● New Belt Conveyor

A new type of belt conveyor adaptable to a wide range of fields and applications is now being manufactured by Industrial Engineering & Manufacturing Company, Inc., Brimfield, Ind. By adding sections and belting, this new universal conveyor can be made in any length required. It can be furnished in any width and can be equipped to operate at any speed. Directional operation is reversible.

By changing the conveyor belt to fit the need, it can be used to convey almost any product. With the addition of sideboards, it will load stone, sand, aggregates, or coal. It is available with wheels for mobile use or without wheels if the conveyor is to be permanently installed for moving materials between floors, etc.

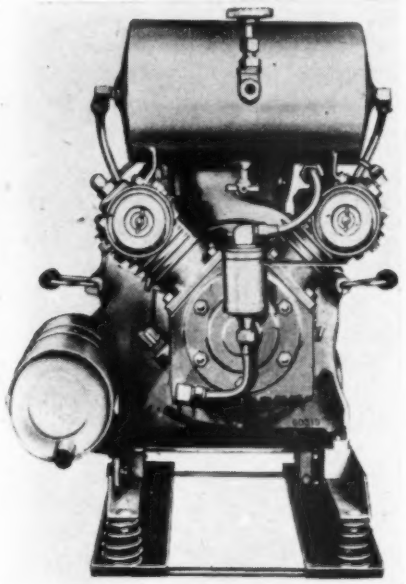
The conveyor may be powered by either electric motor or gasoline engine. A unique feature is the fact that motor and driving unit are mounted inside the formed steel sides. However, they are readily accessible through an opening in the bottom of the conveyor.



● Lightweight Compressor

A new 7 c.f.m. lightweight compressor known as the "Little Workhorse" is announced by Davey Compressor Co., Kent, O. .The unit consists of a "V" type, 2-cylinder, single-stage compressor direct connected to a 4½-hp. air-cooled engine. The compressor has a 2½-in. bore with a 1¼-in. stroke and operates at 3,000 r.p.m

The unit is equipped with an automatic centrifugally-actuated clutch which



momentarily frees the engine from the compressor for starting, but re-engages at about 1500 r.p.m. The machine is designed for operation in all temperatures and is tested for the range of —65 deg. F. to +130 deg. F.

Continuous operating pressure is 100 lbs., but the unit may be run intermittently up to 150 lbs. pressure. Over-all dimensions: length, 29 in; width, 21 in.; height, 27 in. Weight is 117 lbs.

● Swing Clutch

For the past several years, the American Hoist and Derrick Company, 63 South Robert Street, St. Paul 1, Minn., has been conducting exhaustive experiments and research in connection with clutches for locomotive cranes. As a result, an entirely new clutch is now being furnished as standard equipment for swinging and traveling on "American" locomotive cranes.

The newly-designed outside-band clutch is said to overcome the problem of keeping the band perfectly round, enabling its full surface to contact the drum. This has been done by using a double tandem clutch, which consists of two half bands, rather than one full band. Each half band is actuated by separate air cylinder, both air cylinders being controlled by a single valve. With these half bands it is a very simple matter to hold the proper shape during installation and keep the entire band surface in contact with the drum, thus avoiding high spots and jerky operation. This new clutch is available as a replacement on many types of "American" locomotive cranes now in service in the field.

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Possibly changed digging conditions have reduced production of your dredge, or you are moving to a new location and want to use your old dredge; or you need a dredge but don't want to buy a new one right now — these and any other dredge problem are the business of YUBA MANUFACTURING COMPANY to solve for you. We can help you obtain a good dredge at a fair price, and furnish an expert crew to dismantle, move and re-assemble it.

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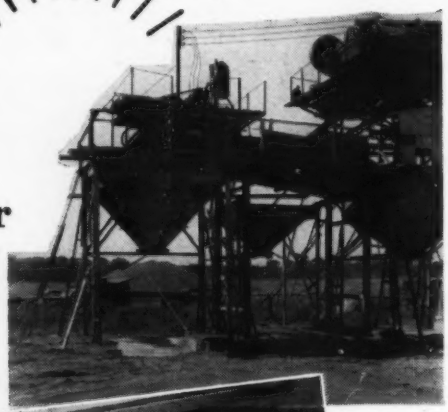
HIGH POINT
IN CLAY BALL REMOVAL

An Eagle Log Washer at the Thomas Gravel Co.



"We installed an Eagle Log Washer to remove clay balls and soft particles from our gravel and we do not hesitate to state that the washer is DOING JUST THAT." There's the satisfied statement of the Thomas Gravel Company after installing an Eagle at their Fort Worth plant. The Thomas pit is a river-bottom deposit of about 90 acres of excellent quality basic aggregate which did, however, need to be cleansed of undesirable material. Eagle sets a new high standard for trouble-free solution of just such knotty problems.

This 7x20 ft. paddle type log washer features the new paddle shoes with corrugated wearing surfaces which scrub and abrade stone against stone as the aggregate is conveyed up to the discharge. The constantly rising column of water from the tub bottom floats out all loosened trash, clay balls, etc. This two-way cleansing action is just one of the reasons why Thomas is able to conclude, "We are highly pleased with the operation of this Log Washer." Send for Catalog 47.

SINCE 1872 Progress...Service

Sand and Gravel Equipment

"SWINTEK" DREDGE LADDERS — SCREW WASHERS
LOG WASHERS — DEHYDRATORS — SAND TANKS
CLASSIFIERS

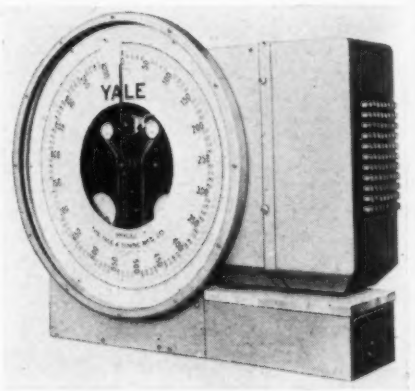
EAGLE IRON WORKS

133 Holcomb Ave. • Des Moines, Iowa

● Weight Printer

A new type of weight printer is now being offered as an integral part of Yale Load King Industrial Scales. It eliminates the uncertainty of the lead pencil and human element by printing actual weights in numerals 9/32-in. high, without additional printing or mental calculation. The various weights in a series can be identified by printing opposite the recorded weight from one to eight symbols, numerals or letters.

Other features reported include: (1) elimination of a slow-dragging or floating pointer action; (2) hinged selector fingers which prevent damage to the selector fingers or printing disc mechanism should the printer be operated while a load is being moved on the scale; (3) printing beyond the full capacity of the dial in the event of careless or accidental operation of the printer with the pointer beyond the last graduation; (4) automatic reversing of the ink printing ribbon by means of an Alnico magnet; and (5) a continuous-duty electric motor which assures uninterrupted operation.



The Yale weight printer can be adjusted to take tickets from 3 in. by 5 in. up to 8½ in. by 11 in. with one to four copies. All copies, including the original, are carbon backed and of regular weight.

The printer is actuated by a depressing bar directly beneath the ticket slot. It makes an electrical connection actuating a small electric motor, which drives a series of gears and cams causing the selector fingers to reach in and position themselves on the notched discs on the back of the pointer shaft. After the selector fingers have positioned themselves, a solenoid is actuated, causing a rubber platen to press the inked ribbon against the sectors carrying the type, which makes an impression of the weight.

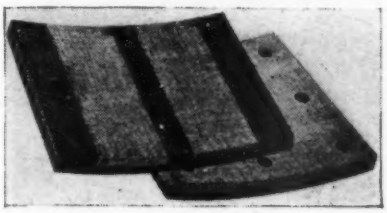
The standard printer operates on 100-volt, 60-cycle, single-phase, a.-c. current. However, it can be furnished for operation on other currents on special request. The Yale & Towne Manufacturing Company, Philadelphia Division, Philadelphia, Pa.

● Combination Brake Blocks

Gatke Corporation, 228 N. La Salle Street, Chicago 1, Ill., offers a new development—MW brake blocks—which combines the two main types of asbestos friction materials integrally moulded into unified brake blocks.

Originally developed to meet the re-

quirements of flame-hardened drums, MW brake blocks combine the qualities of woven asbestos and molded asbestos materials in proper balance for the specific application. Variation in the com-



positions and the proportions of the two materials provides adjustment of characteristics to the given requirements. Thus the quick positive engagement of woven material can be tempered with the smooth, non-grabbing action of molded. The proper degree of drum conditioning can be provided to assure frictional stability and avoid glazing on any kind of drum.

MW brake blocks are non-compressible, and the molded backing provides secure anchorage. Bolt heads do not pull out.

● All-Purpose Truck Tire

A new "Rock-Logger" tire, for use both off the road and on the highway, is announced by The B. F. Goodrich Company. The tire has been developed for the specific usage and tested for the last two years.

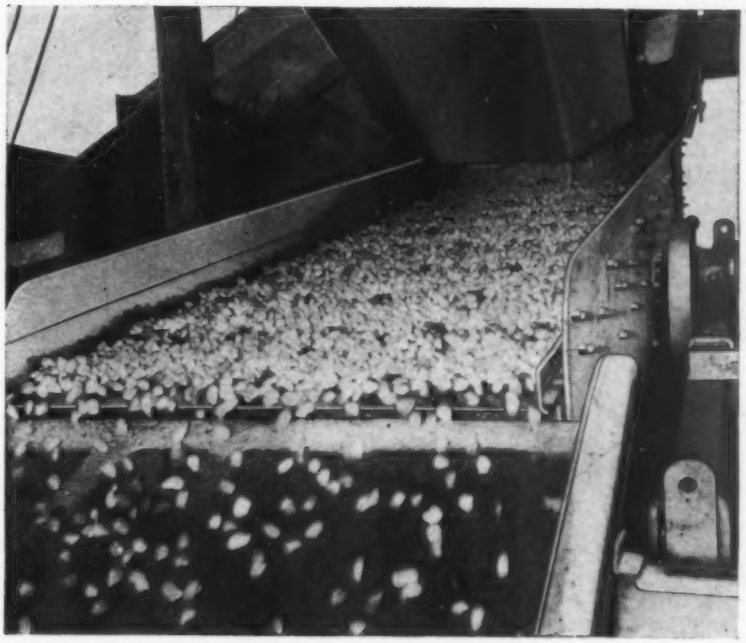
The company states that the tire is an offshoot of the development of better and longer haul roads by contractors, loggers, strip and open-pit mine operators as use of off-the-road tires has increased, and that the new casing is a solution to the problems encountered in the dual-type service.

● Materials Handling Items

The Baughman Manufacturing Co., Inc., Jerseyville, Ill., offers its line of belt and bucket elevators, screw-type conveyors, and horizontal trough belt under-track unloaders to operators of quarries, material yards, and block, batching, gravel and cement plants.

Pictured here is a popular piece of equipment—the Model 190 heavy-duty troughed belt unloader designed for users of semi-permanent trackage setups. The belt is supported by bell rollers placed close together. The grease-sealed ball-lubricated bearings are protected from dirt and water. Positive traction is accomplished through the use of Baughman spider-type pulleys. Power is transmitted through worm gear reduction.

Here's Accurate Sizing at 3½ Tons A Minute



This SECO Vibrating Screen Now in 11th Year of Service for B. V. Hedrick Gravel and Sand Co., Lilesville, N. C.

Here's another example of how Seco vibrating screens are making screening more profitable for operators. The positively controlled, true circular action of a Seco is your assurance of accurate sizing, high tonnages and low maintenance.

The Seco pictured here is mounted high up in the air, yet it operates so smoothly that no vibration is transmitted to the supporting framework. No matter what screening you have to do—coarse gravel, stone, sand or ag-lime, a Seco will do it efficiently and economically and will serve you faithfully for many years.

Send your screening requirements to Seco or write Dept. L for New Catalog No. 203

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In Canada, United Steel Corp. Ltd., Toronto, Ont.

HANDLES 35% SOLIDS 4000 gpm!

In the phosphate fields of Florida, rugged "pit cars" are used to pump phosphate rock and water from the pits to the washeries and treatment plants. Each "car" is a sturdy structure that supports the pump and houses the electric motor and controls. Skids permit moving from one location to another. On board is a Morris 10-inch Heavy Duty Dredging Pump that delivers, day after day, approximately 4000 gpm of mixture with 35% phosphate rock by volume.

MORRIS DREDGING PUMPS...

Wherever dredging operations demand a pump that provides longer service . . . less maintenance . . . more economical operation . . . there you'll find a Morris. For every Morris Dredging Pump is scientifically designed around certain field-tested features that guarantee better performance . . . features such as:

Heavy pump shaft—to transmit maximum power . . . withstand sudden stresses . . . prevent destructive whipping.

Oil-lubricated anti-friction bearings—to preserve correct and rigid alignment of the shaft . . . provide quieter operation.

Rigid structural steel frame—to further maintain alignment . . . reduce vibration.

Axial adjustment—to permit restoration of required clearances in only a few minutes.

Interchangeable parts—to enable substitution of vital pump parts of different alloys to compensate for changes in corrosive or abrasive action of materials handled.

Modern design—to provide high efficiency . . . reduce initial investment and operating costs.

FREE SERVICE Morris Dredging Pumps are built in standard, medium duty, and extra heavy types, in sizes from 4-inch to 48-inch, with electric motor, steam, Diesel or gasoline engine, or for belt, chain or gear drive. At no obligation on your part, Morris Engineers will be glad to study your needs and recommend the pump best suited for your purposes. Send in the necessary data today.

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MORRIS CENTRIFUGAL PUMPS

● Hydraulic Loader

The Davis Skyline Series "90" front-end hydraulic loader features a third ram, which is a two-way actuating ram giving positive control of all attachments in all positions. It is said to speed up clean and accurate dumping and return of buckets or forks.

This two-way ram develops over 8,000

lbs. of pressure on the down stroke and 6,500 lbs. on the up stroke, which enables actual digging and the breaking loose of heavily imbedded objects.

The "90" has its own complete hydraulic system, including Pesco Pump, and the entire loader can be removed as a unit without breaking any of the hydraulic lines.

Some of the other outstanding features of the "90" are:

(1.) Low clearance, with no superstructure, facilitating transportation. (2.) clear visibility for operator; (3.) rugged, reinforced basic back to which all attachments are fitted; (4.) flexibility without sacrifice of strength or ruggedness.

The "90" is at present available for nine models of tractors—Ford, Ferguson, Farmall M, Farmall H, John Deere A, John Deere B, Allis Chalmers WC, Oliver Row Crop 70, and Massey Harris Senior 101-44 and Junior 102.

● Non-Electric Magnets

Magnets for all industrial processors have been developed by the Magni-Power Company, Wooster, O., for the protection of equipment and product. By means of these non-electric magnets, trash iron and particles are removed from flowing material.

Four types of magnets are offered. Type 1 is not hinged and is not to be installed on metal; Type 2 is hinged, and is likewise not designed for installation on metal; Type 3 is not hinged, but can be used on metal; Type 4 is hinged and can be applied to metal. These devices are available in two classes: Magni-Power standard magnet for the average iron extraction application and Magni-Power master magnet for use where an especially difficult condition exists.

The company also offers a portable cabinet containing two magnets for removing very small iron particles. The cabinet is made of stainless steel and aluminum; capacity is 300-400 gallons per hour.

This firm is seeking distributors for its product.

trade notes

New distributor of Hyster lift trucks, straddle trucks and mobile cranes in the vicinity of Baltimore, Md., is the McCall-Boykin Co., Inc., at Calvert and 20th Streets in Baltimore.

Headed by W. S. Boykin, president, and John M. McCall, vice-president, the company will handle Hyster sales and service in all of Maryland except Washington, Allegany and Garrett counties; in Kent and Sussex counties of Delaware; in Accomac and Northampton counties of Virginia; and in the District of Columbia.

Paul E. Lundquist has been named sales manager of the newly formed Construction Equipment Division of Pettibone Mulliken Corp. Mr. Lundquist, formerly vice-president of Republic Drill and Tool Company, will assist E. J. Seifert, president, on matters relating to the corporation's sales policies, advertising, and the expansion of its line of construction equipment.

The appointment of James W. Wells to the position of sales manager of Chase Bag Company's Portland, Ore., branch has been announced by R. N. Conners, vice-president and general sales manager. Mr. Wells succeeds Robert R. Koch, who was recently made manager of the newly acquired Chase factory in Los Angeles.

Recently appointed North Carolina distributor for the Koehring Company of Milwaukee, the Mitchell Distributing Company, Spruce Pine and Raleigh, N. C., will handle the complete Koehring line of heavy-duty construction equipment, along with products of the three Koehring subsidiaries, C. S. Johnson, Kwik-Mix and Parsons.

Paul J. Breden has been named Southern district manager for the New York Belting and Packing Company, succeeding J. Edwin Conaway, who died on December 14 as the result of injuries sustained in an automobile accident near Cisco, Tex.

Mr. Breden assumed his new duties on February 1, with headquarters in Dallas, Tex.

Harold F. Mosher has been named manager of the Dallas district of the Industrial Products Sales department, The B. F. Goodrich Company, succeeding Robert T. Kain, who died in December, 1948. Mr. Mosher had been manager of special industrial merchandise sales for the last six years. He is succeeded in that post by D. W. Raleigh.

Francis W. Vigneault Jr. has been named district representative for Hyster tractor equipment in the Northeastern territory. Mr. Vigneault has been connected with the Caterpillar Tractor Co. since 1940, except for three years of military service.

Rodney Kox

Rodney Kox has joined the Four Wheel Drive sales staff as special field representative. He will work with F.W.D. salesmen and distributors throughout the United States.

Mr. Kox came to F.W.D. from the Family Life Insurance Company of Chicago, where he had served as sales manager.

Announcing the NEW

LIMA TYPE 1002

Convertible SHOVEL, CRANE and DRAGLINE

Features

- Precision Air Control
- Anti-Friction Bearings
- Independent Chain Crowd on Shovel Boom
- Truck base—one-piece double annealed steel casting
- Rotating base—one-piece reinforced annealed steel casting
- Dependable Diesel power unit
- Tubular Dipper Handle
- Extra long, wide crawlers
- Large diameter cable drums
- Extra large, point sheaves
- Modern full vision streamlined cab
- Independent Propel (Optional)

—and many others.

This new addition to the LIMA line now makes available a convertible unit with 2½-yard shovel and 61-ton* crane capacity. Like all LIMA machines, the 1002 is engineered and built for maximum output at low operating costs and with minimum maintenance. It is equally effective as a shovel, crane or dragline, and readily converted from one to the other. Tested "on-the-job" for many months under the most gruelling conditions, it has established new records for speed and stamina. We proudly present it as the outstanding machine in its field.

Other LIMA excavators include Shovels—¾ to 6 yards, Cranes 13 to 110 tons and Draglines variable. Write for descriptive bulletins.

*With 60-foot boom at 12 foot radius.

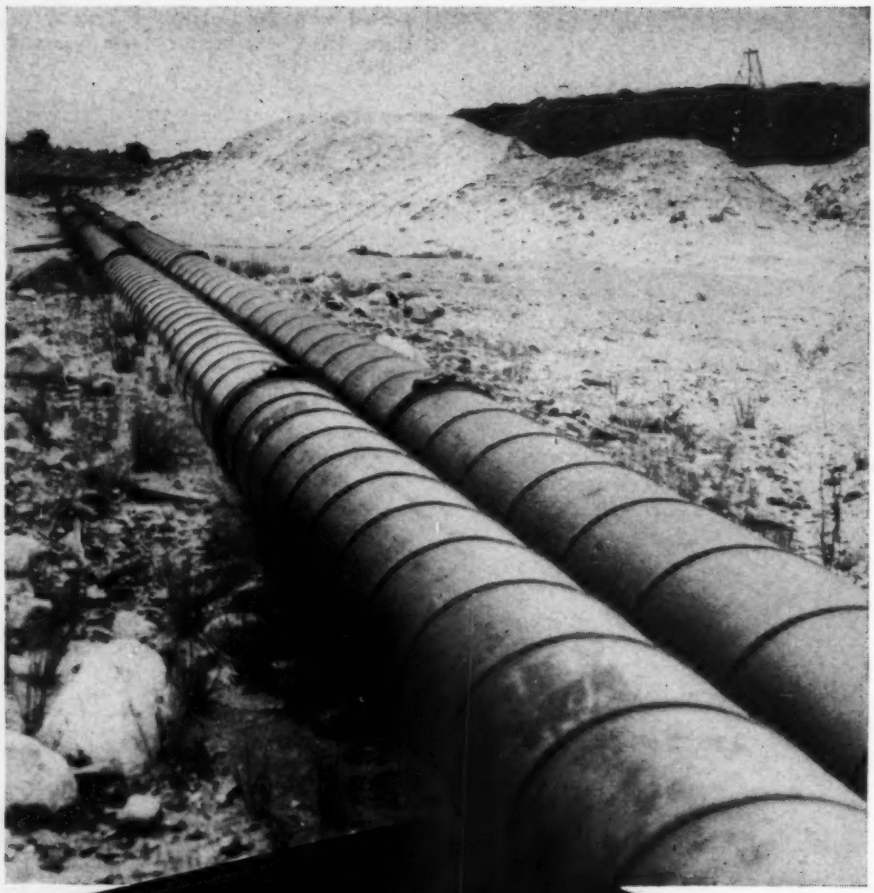
It will pay you to consult your nearest Lima Sales Office or representative before you buy your next shovel, crane or dragline. Offices in principal U.S. cities.

Lima Shovel and Crane Division

LIMA, OHIO

LIMA HAMILTON CORPORATION

OTHER DIVISIONS: Lima Locomotive Works Division; Niles Tool Works Co.; Hooven, Owens, Rentschler Co.



THIS NAYLOR COMBINATION IS OUTSTANDING IN MINING SERVICE

This picture shows Naylor light-weight pipe joined with Naylor Wedge-Lock Couplings—a sight that is becoming more and more familiar in the mining fields because of the unusual advantages of this combination. The pipe provides light weight, greater safety and economy without sacrifice of strength. The couplings simplify and speed up connection. Together, these Naylor products give you lines that out-perform ordinary light-weight pipe in high or low-pressure service. Sizes from 4″ to 30″ in diameter.

Naylor Pipe

NAYLOR PIPE COMPANY

1257 East 92nd Street, Chicago 19, Illinois

New York Office: 350 Madison Avenue, New York 17, N. Y.

Machinery & Supplies Company, Inc., of Kansas City, Mo., has been appointed distributor of Hyster lift-trucks, straddle trucks, and mobile cranes, it was announced recently by C. H. Collier Jr., head of Eastern Division truck sales for the Hyster Company. The firm will handle Hyster sales and service in 60 counties of western Missouri, 31 counties of northern Oklahoma, and all of Kansas.

Three appointments were recently announced by the United States Rubber Company. James E. Power has been named manager of national accounts sales for the Mechanical Goods Division.

W. A. Tipton was appointed manager of branch sales for the Mechanical Goods Division; and O. S. True became district sales manager for the division's New York branch.

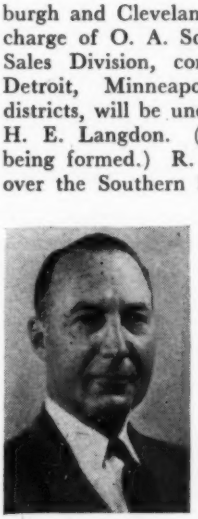
A complete reorganization of field supervision of the Mechanical Goods Sales Division has been announced by this Goodyear division.

The new Eastern Sales Division, consisting of the Boston, New York, Pitts-

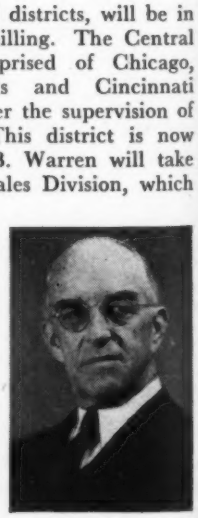
O. A. Schilling

R. B. Warren

burgh and Cleveland districts, will be in charge of O. A. Schilling. The Central Sales Division, comprised of Chicago, Detroit, Minneapolis and Cincinnati districts, will be under the supervision of H. E. Langdon. (This district is now being formed.) R. B. Warren will take over the Southern Sales Division, which



R. G. Abbott



H. E. Langdon

will include the Charlotte, Atlanta, St. Louis and Dallas districts. R. G. Abbott, who will continue to operate in the capacity of district manager in Los Angeles, will head-up the Western Sales Division.

Mr. Schilling joined Goodyear in 1939, starting as a field representative in Houston. He became district manager of the Dallas district in 1941, a post he held until 1947 when he became Eastern sales manager.

Mr. Langdon has been associated with Goodyear for the last 29 years. Mr. Warren joined Goodyear in Akron in 1927, and Mr. Abbott a year earlier. The latter spent five years with Goodyear airship operations during the building of the dirigibles, *Akron* and *Macon*.

Chain Belt Company of Milwaukee announces the appointment of William A. Clayton as Eastern sales representative for the Construction Machinery Division of the firm. He will have his headquarters at the New York district office of Chain Belt Company, 19 Rector Street, New York 6, New York. Mr. Clayton was formerly a partner of the Fuchs-Clayton Machinery Company of Nebraska, a distributor of Rex Construction Machinery.

The transfer of R. H. Ayers from the Detroit sales office of Chase Bag Company to the position of sales manager of the company's Toledo branch was recently announced. His new assignment will include the direction of sales in the entire state of Ohio and parts of Michigan, Indiana, and West Virginia, with headquarters in Toledo.

A. B. Babbitt, who for 28 years was connected with The Kent Machine Company of Cuyahoga Falls, Ohio, recently resigned from the presidency of the company. He was succeeded as president by H. T. Young, who was his assistant for several years.

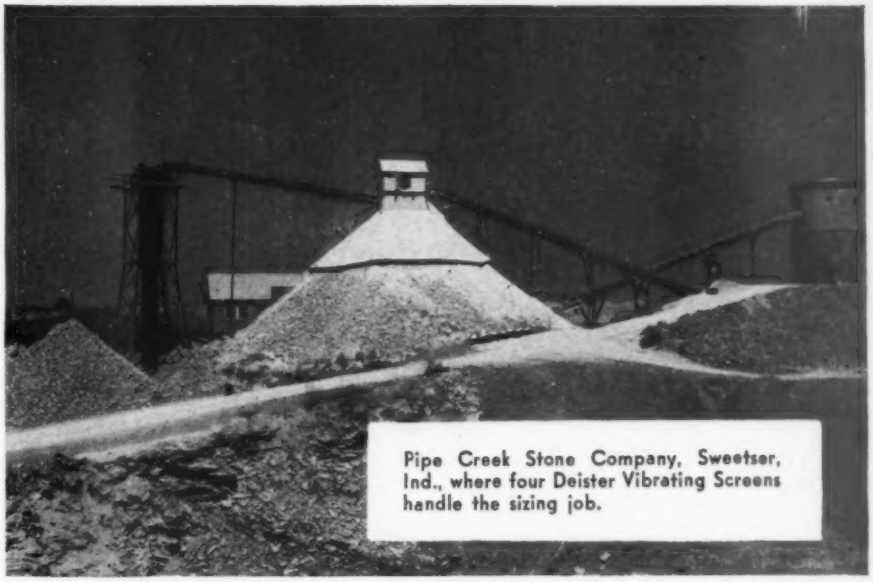
Mr. Babbitt continues with the company as a member of the board of directors.

M. W. Sledge has been appointed assistant manager of the belting sales department of the Goodyear Tire & Rubber Company, replacing the late W. P. Hallstein. Mr. Sledge joined Goodyear in 1935 as a member of the production squadron in Akron.

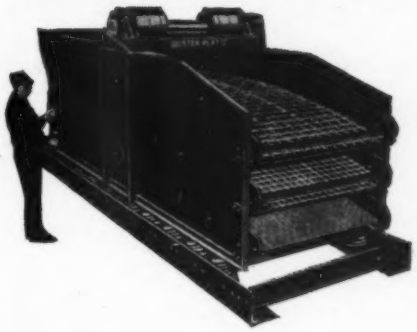
Walden W. Paape, domestic sales manager for the Euclid Road Machinery Company, died unexpectedly at his home in Willoughby, Ohio, on March 18. Before joining Euclid in 1945, Mr. Paape had been associated with the LaPlant-Choate Manufacturing Company, the Caterpillar Tractor Company and the Syracuse Supply Company.

Three major staff promotions in the mechanical goods, general products, Lastex yarn and rubber thread divisions of United States Rubber Company, have been announced.

Walter F. Spoerl, general sales manager of the Mechanical Goods Division, has been named general sales manager for all divisions under E. G. Brown's supervision. Robert D. Gartrell, development manager for the company's Passaic, N. J., plant, has been named development manager for all divisions. Wesley A. Armstrong, factory manager of the company's Bristol, R. I., plant, has been appointed production manager.



Pipe Creek Stone Company, Sweetser, Ind., where four Deister Vibrating Screens handle the sizing job.



Four DEISTER Screens ... 1800 Tons per Day

Four Deister Vibrating Screens are producing up to 1800 tons per day at the Pipe Creek Stone Company, Sweetser, Ind. — one of several plants operated by Irving Brothers. In operation 24 hours daily during peak periods, the plant produces all sizes of material from agricultural limestone up.

F. W. Irving, manager of the Pipe Creek plant, says the firm has operated Deitser Screens since 1931. All screens are still in operation . . . still taking a tough pounding hour after hour . . . still producing aggregates in a wide range of sizes, accurately and cheaply.

The Irving Brothers prefer Deister Vibrating Screens because they run longer with less trouble . . . they are among the many who have found it more profitable to standardize on Deister Screens. For complete information on how Deister Vibrating Screens grade better without overloading . . . give you higher capacity with lower maintenance costs . . . write the Deister Machine Company for your copy of "Better Sizing Cheaper."

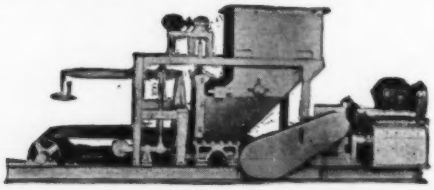
DEISTER SCREENS

DEISTER MACHINE CO.

FORT WAYNE 4, INDIANA

Keep Production Rolling

with Today's High-Speed Scale



PRECISION BUILT for PRECISION WEIGHING

SCHAFFER POIDOMETER

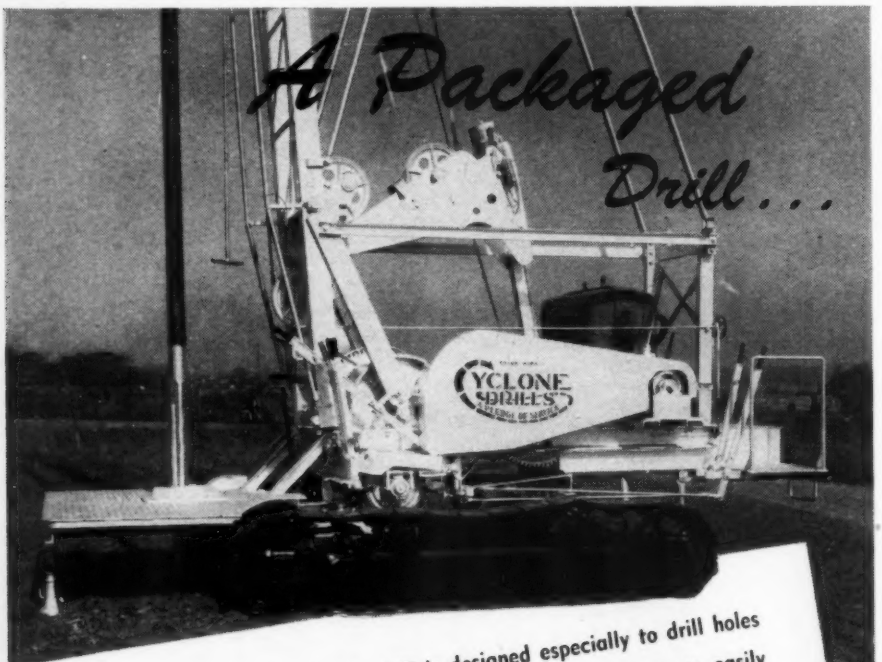
SCHAFFER Poidometers are a big factor in helping to satisfy the expanding demands made on producers of raw and finished bulk materials.

These modern scales provide quick, accurate, and automatic weight records at various stages of material handling, whether the process involves weighing, blending, feeding, mixing, recording, or proportioning.

SCHAFFER Poidometers are finely engineered and durably constructed for continuous, economical operation.

Write for Catalog No. 5

SCHAFFER POIDOMETER CO., 2828 Smallman Ave., Pittsburgh 22, Pa.



The new #1000 blast hole drill is designed especially to drill holes from 5⅝" to 7" in diameter. Self propelled, this drill moves easily and quickly to any location. Drilling tools can be carried directly on the drill while moving.

SANDERSON CYCLONE DRILL CO.

ORRVILLE OHIO

George G. Raymond Jr., sales manager at Lyon-Raymond Corporation, Greene, N. Y., was recently elected to the office of vice-president by the board of directors. In addition to his new duties, Mr. Raymond will continue to act as sales manager.

Broderick & Bascom Rope Company, St. Louis, announces two changes in executive responsibility. Fred Zimmerman, vice-president, who has been in charge of sales, assumes the new title of director

F. Zimmerman

J. J. Sieber

of sales. J. J. Sieber has been appointed sales manager.

Mr. Zimmerman joined the Broderick & Bascom organization in 1911 and has been continuously with the organization since then. Mr. Sieber has most recently been chief products engineer, operating from the home office. Prior to that he was connected with the Seattle factory and branch as sales engineer. He joined Broderick & Bascom in 1929.

F. B. Baca, former plant manager of the Hardsocg Division of Cardox Corporation, Ottumwa, Iowa, has recently been appointed to the post of chief engineer of the division. In his new position Mr. Baca will be responsible for all engineering on the company's new product development program. His headquarters will be in the company's Chicago office.

The election of Stanley M. Hunter by the board of directors to fill the newly-created position of executive vice-president is announced by the American Hoist & Derrick Company, St. Paul, Minn.

Mr. Hunter joined the sales department of American Hoist in 1936 and has served as vice-president of sales and as a member of the board of directors since 1945.

The Osgood Company and The General Excavator Company, both of Marion, Ohio, announce the appointment of new distributors for their power shovels and materials-handling equipment, as follows:

Contractor's Service, Inc., 317 W. Worthington Ave., Charlotte, N. C., has been appointed distributor of Osgood and General products in the entire state. Dulaney Service Company, San Antonio 4, Tex., has been appointed distributor in southern Texas. The Manning Equipment Co., Lansing, Ill., distribute Osgoods and Generals in the northern half of Indiana (with the exceptions of Lake, LaPorte, and Porter counties).

F. H. Ludington

At the annual meeting of the Textile Bag Manufacturer's Association held recently in New Orleans, F. H. Ludington, retiring president, was honored for his service to the association during his three-year term in that capacity.

Mr. Ludington, president of Chase Bag Company, served the association as vice-president for 11 years before his election to the office of president. Homer V. Howes of Bemis Bro. Bag Company was elected to succeed as president of the association.

Raymond P. Russell has been named manager of the Boston district of the industrial products sales department of The B. F. Goodrich Company. Mr. Russell succeeds John M. Cooney, who has been transferred to the managership of the Akron, O., district.

Continuing a policy of providing maximum service to the instrumentation and control fields, Bailey Meter Company, Cleveland, Ohio, has announced another large expansion of its staff of field engineers.

Twenty seven men, all engineering graduates of universities or technical schools, have completed the company's special training program, a requisite for all Bailey meter engineers, and eleven are now being assigned to various branch offices.

Edward T. Credle, president of Credle Equipment, Inc., Utica, N. Y., announces a change in the company's name. In the future the firm will be known as Credle-Nolan Equipment, Inc.

The Butler Bin Company has announced the appointment of M. R. Butler Jr. as general plant superintendent. Mr. Butler, formerly a member of the company's engineering staff, also served in the capacity of advertising manager, a position he still retains.

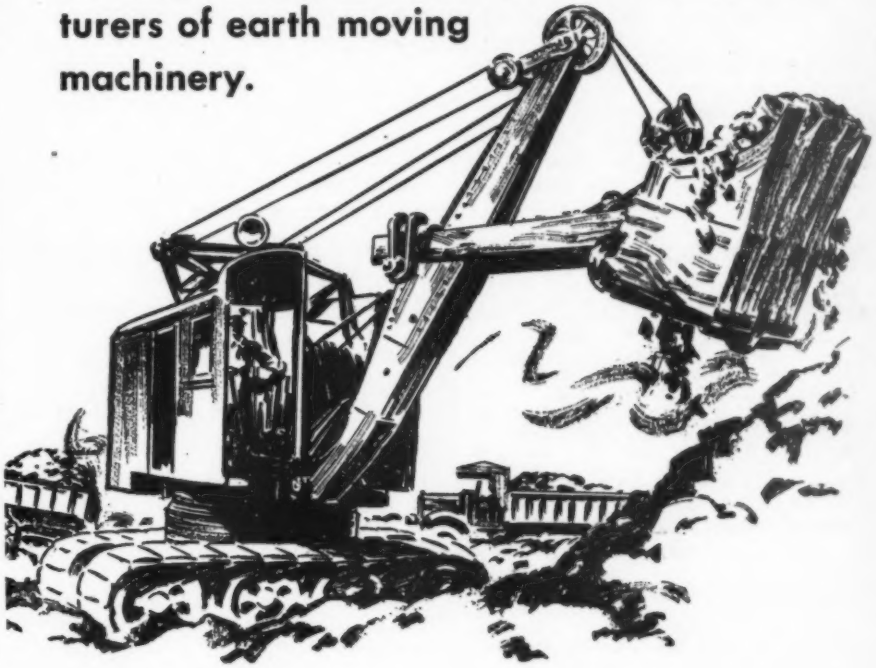
Arthur B. Austin, formerly assistant manager of the Hercules Powder Company explosives office in Chicago, Ill., has been named manager of the Joplin, Mo., explosives office. He replaces M. W. Latimer, who died suddenly at his home in Joplin on February 23.

S. W. Corbin has been appointed assistant manager of the industrial divisions of General Electric's apparatus department. Mr. Corbin also is manager of the Resale Industries Division, a position he assumed in 1943 and will retain along with his new appointment.

William A. Schaub has been named manager of the Denver district of the industrial products sales department of The B. F. Goodrich Company. Mr. Schaub has been with the company since 1918, all his service being in industrial products sales.

EASY TO WEAR-IN!

J-M INDUSTRIAL FRICTION MATERIALS
wear well from the start... are specified as original equipment by most manufacturers of earth moving machinery.



HARD TO WEAR-OUT!

J-M INDUSTRIAL FRICTION MATERIALS
wear slowly and evenly...are preferred by operators who keep maintenance costs low.

• J-M says "stop" and "go" to more tonnage than any other friction materials.

Replace with J-M Industrial Friction Materials and get better braking performance always. You're sure of long service, high braking efficiency and economical operation. Exceptionally durable, mechanically strong, J-M Friction Materials withstand faster speeds, heavier loads, harder shocks and higher temperatures. See your J-M Friction Material distributor or write Johns-Manville, Box 290, New York 16, N. Y.

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INDUSTRIAL FRICTION MATERIALS
No. 1 With Leading Manufacturers

legal decisions

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

A few days ago a reader wrote an interesting letter, in part, as follows: "We took a contract to haul sand and gravel to a job. Due to delay of the general contractor we lost money on this contract. Can we sue and get damages from the general contractor?"

According to a recent higher court, a sub-contractor *cannot* recover damages for loss of time caused by a general contractor's delay, unless the sub-contractor's written contract so provides. Also, this court refused to listen to testimony of a verbal agreement in this respect.

For example, in *E. J. Albrecht Company v. New Amsterdam Casualty Company,* 163 Fed. (2d) 16, a general contractor let to a sub-contractor a sub-contract for the hauling of stone, cement, and sand. The sub-contractor furnished trucks and other equipment necessary to haul the material. The sub-contract contained *no* provisions for idle time but merely specified that the work of the sub-contractor was to be carried on according to plans of the general contractor, and that the sub-contractor was to be paid for the work he performed. In other words, the contract contained no provision for bonus payments in event the sub-contractor's work was completed before the time allotted.

In subsequent litigation the higher court held that the sub-contractor could not recover damages from the general contractor for alleged delay and negligence of the latter in keeping the sub-contractor's trucks idle. Also, this court held that any verbal agreements between the general contractor and the sub-contractor could not be used to vary the terms of the written contract. The court said:

"Dushney (sub-contractor) makes the point that he suffered damages through the delay and the negligence of the plaintiff (general contractor), who kept Dushney's trucks idle. . . . There was no provision in the written sub-contract for idle time."

For comparison, see *Mansfield v. New York Company,* 102 N.Y. 205. Here the parties entered into a contract for the erection of a pier. Under the terms of the contract the property owner was to prepare the foundations for construction. The contract stated that time was "of the essence." In view of this clause the higher court held the contractor liable for delay in completing the work.

And in *Tobey v. Price,* 75 Ill. 645, a sub-contractor was held liable to the general contractor for damages when he violated an express provision of the written contract by *not* supplying the necessary materials.

Hence the law is well settled that if either a property owner or a general contractor agrees in a written contract to perform work in a specified manner, or without any delay, or within a stipulated time, he is liable for financial losses caused others by breach of the contract. Otherwise there is no liability.

Deed Broadly Construed

Considerable discussion has arisen from time to time over the legal question: Is a clause in an old deed which gives a right of way for "vehicles" strictly construed so as to exclude gravel trucks? The answer is no unless the deed clearly states that the right of way is for "teams" or horse-drawn vehicles *only.*

For example, in *Hodgkins v. Bianc,* 80 N. E. (2d) 464, the testimony showed facts, as follows: One Bianc owned several trucks which he used to haul sand

EASY MANEUVERABILITY—RUGGED DEPENDABILITY

MINNEAPOLIS-MOLINE
MM
MODERN MACHINERY

INDUSTRIAL WHEELERS

Get More Work Done Per Hour.....

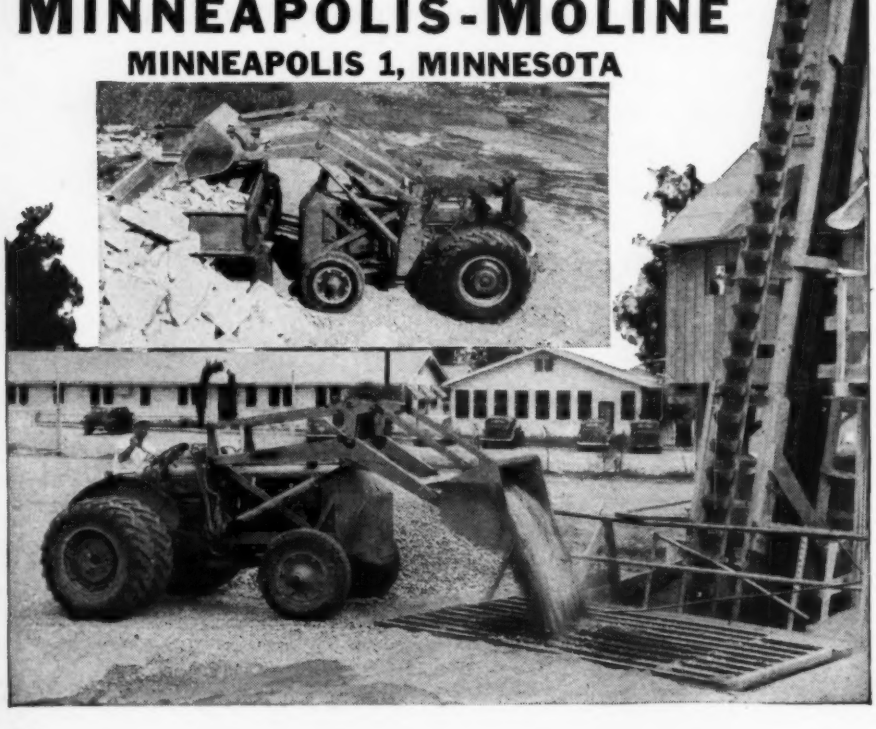
When you want to speed the job—do it with MM Industrial Wheellers. Operators of ready-mix concrete plants report loading 70-80 tons of gravel per hour with MM Industrial Wheelers on average hauls of 100 feet from stockpile to hopper.

Investigate these advanced-design features that assure you dependability on rugged jobs!

- Shuttle Gear for 6 forward and 6 reverse speeds up to 14.5 m.p.h.
- "Roller Spin Steering" has roller and needle bearings from steering wheel to ground.
- RTI high-compression valve-in-head engine with 150 fewer wearing parts.
- Extra strong heavy-duty clutches.
- Heavy cast front-wheel centers and fabricated H-type front axle.
- High turbulence combustion chambers and regulated cooling for extra power output.

See Your Nearest MM Dealer, Distributor or Write

MINNEAPOLIS-MOLINE
MINNEAPOLIS 1, MINNESOTA



and gravel. He purchased real estate having a gravel pit thereon. The original deed dated 1820 gave an easement to "use a lane" through adjacent private property. The clause in this deed simply specified that the lane could be used as a "cart road." The owner of the private property sued Bianc and asked the higher court to enjoin him from using the lane to haul gravel in trucks. The higher court refused to do so, and said:

"A 'cart road' used in the earlier deed constituted, we think, a grant of a general right of way for vehicles and did not restrict its use to horse-drawn vehicles or limit the way to the width of vehicles then in common use."

For comparison, see *Clarkin v. Duggan,* 292 Mass. 263. Here the grant of the right of way in the deed specified "teams only." The court held it obviously did *not* include automobiles.

Seller Refused to Deliver

It is a proverbial principle of law that a seller is not permitted to take advantage of his own wrong.

For illustration, in *Stewart v. Moss,* 192 Pac. (2d) 362, it was shown that a seller sold a gravel truck to one Stewart for $5,500 and accepted $500 down, under a contract in which he Stewart agreed to pay an additional sum of $2,500, within one month, at which time he could take possession of the truck.

A disagreement arose and the seller refused to deliver up possession of the trailer to Stewart, who filed suit. The court promptly ordered the seller to refund all moneys, plus interest received from Stewart and said:

". . . A seller who has retained possession of the subject matter of the sale may not, upon the default of the purchaser, retain the payments made by the purchaser, if that default has been occasioned by the conduct of the seller in refusing to cooperate with the purchaser."

Minor Rescinds Contract

All higher courts agree that a minor may *at any time* rescind a purchase contract and demand refund of *all* money he has paid. Also, the fact that a minor made a purchase contract in partnership with an adult does not change the legal status of a minor.

For example, in *Ferita v. Torrise,* 61 Atl. (2d) 836, the testimony showed facts, as follows: A minor named Ferita and an adult named Gonz signed a contract to purchase a building for $7,500. The sum of $2,600 was paid down. Later Ferita decided to rescind the contract and filed suit. During the trial he proved that he paid the full $2,600 down payment. Therefore, the higher court ordered the property owner to cancel the contract and refund $2,600 to Ferita. The court said:

"The minor disaffirmed the contract. He is entitled to a recovery to which the law entitles him."

Assumption Is Proper

Very frequently a court may *assume* with only slight evidence that an employee who returned to his work after an injury is entitled to additional compensation under the State Workmen's Compensation Act.

For example, in *Wynn v. Vaughn,* 33 So (2d) 711, it was shown that one Wynn was working as a derrick man when he sustained a severe blow on the left leg from a broken piston rod of the pump on the rig. He had a fracture of the tibia and a compound fracture of the fibula between the knee and the ankle. He was immediately hospitalized. He received compensation under the State Workmen's Compensation Act at the rate of $20.00 per week until he returned to work for his employer. Sixty days later he was forced to discontinue his work, by reason of his pain and suffering and the inability to properly perform his duties. He sued his employer for compensation under the State Workmen's Compensation Act.

The higher court awarded the employee compensation for 400 weeks at $20 per week.

Warning Disregarded

According to a recent higher court, the owner of a private roadway may avoid liability for injuries to automobile owners on the roadway if large *signs* are posted warning motorists of danger.

For example, in *Robins v. Great American Indemnity Company,* 37 So. (2d) 337, it was shown that the owner of a private roadway leading to a gravel pit posted signs warning travelers to maintain a careful lookout for loaded gravel trucks. Despite this warning an accident occurred when a passenger au-

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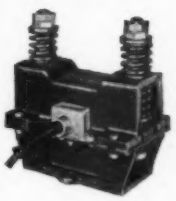
Speeds Up Bulk Material Handling at Reduced Cost

"Pulsating Magnet"

ELECTRIC VIBRATORS



Keep Bins, Hoppers and Chutes Open and Free-Flowing

Banged-up and dented bins and hoppers cost money in replacement and in man hours lost—and that's where SYNTRON Vibrators come in. They eliminate the arching and plugging that takes a man's time to pound, and damage, those bins and hoppers.

Write for literature!

SYNTRON CO.

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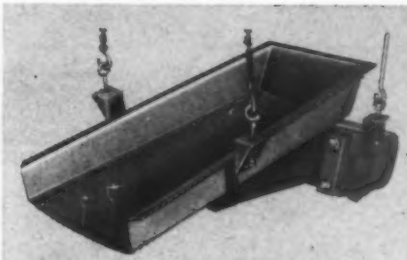
LONG "Vibratory" CONVEYORS
No Motors, Gears or Other Mechanical Wearing Parts



VIBRATORY FEEDERS
Up to Hundreds of Tons per Hour — Rheostat Control of Flow

VIBRATING GRIZZLIES
Both Feed and Scalp With One Unit

VIBRATING SCREENS
Wet or Dry — Single or Multiple Decks

tomobile collided with a loaded gravel truck where the road narrows on either side of a one-way bridge.

The higher court refused to hold the owner of the gravel pit liable in damages, and said:

"The driver of plaintiff's car was negligent in that he disregarded the warning to maintain a careful lookout. It is established that there was no reason why he could not have observed the approach of the heavily-loaded gravel hauling unit at a sufficient distance to have permitted bringing his automobile to a stop before entering upon the narrow portion of the road."

Law of Bailment

According to a recent higher court when quarry equipment is "pledged" or left as security for a loan, the holder is a "gratuitous" bailee and therefore *not* required to use *any care* to safeguard the equipment.

For example, in *Cook v. Bingman,* 179 Pac. (2d) 470, a man named Cook sued a man named Bingman for the sum of $40,000 actual damages and $10,000 punitive damage for the alleged conversion of certain equipment and supplies.

The testimony showed that Cook had left in the care of Bingman a large quantity of tools, equipment and supplies as part security for a note for $5,000. Later Cook paid this note but did *not* remove the equipment from Bingman's land. Some time later the tools, equipment and supplies were stolen or disappeared from Bingman's land.

The higher court held Bingman *not* liable, saying:

"Plaintiff's entire argument on this appeal is predicated upon the theory that the relation of pledgor and pledgee continued to exist after full payment and satisfaction of the debt to secure which the pledge was given. This theory is erroneous. . . . When plaintiff (Cook) paid off and discharged the $5,000 note for which the property is alleged to have been pledged as security, the pledge was thereby terminated, and the property ceased to be a pledge but became a gratuitous bailment."

Proof Insufficient

All courts agree that an injured person who sues for damages *must prove* and convince the jury that negligence of the party being sued caused the injury, or he cannot win a favorable verdict.

For example, in *Dowell, Inc. v. Jowers,* 166 Fed. (2d) 214, it was disclosed that a man named Jowers was employed as a driller by the Penrod Company. He was killed. Dowell, Incorporated, did the actual work of acidizing.

Jowers' widow sued Dowell, Incorporated, for $220,871 damages, claiming that her husband's death resulted from negligence of a foreman of the company.

The lower court held in favor of the widow but the higher court reversed the verdict, saying that the evidence did not prove to the jury that Jowers' death was caused by negligence of the foreman.

Must Select Proper Court

Failure of a party who files a suit to select the proper court very frequently results in considerable expense and loss of time without any results or benefits to either litigant.

For illustration, in *Walker v. Fitzgerald Sand and Gravel Company,* 37 So. (2d) 712, the testimony showed facts, as follows. A land owner named Walker conveyed to one Kerlin all of the sand and gravel in and under a certain tract of land for a consideration of $25, plus payment of 4 cents per cubic yard for all gravel mined and removed from the property. The contract was subsequently assigned by Kerlin to the Fitzgerald Sand and Gravel Company, which thereafter removed a large quantity of sand and gravel from the land, making payment of 4 cents per cubic yard for all gravel withdrawn in accordance with the terms of the agreement. Although Kerlin accepted these payments, he was dissatisfied with the arrangement, c o n t e n d i n g that the amounts received were insufficient, and consulted an attorney for the purpose of having the contract cancelled.

A suit was filed against the Fitzgerald Sand and Gravel Company which stated that the value of the sand and gravel involved was more than $100 but that it did not exceed $2,000. According to a state law suits for less than $2,000 must be filed in the Court of Appeal rather than the Supreme Court.

Although 35,402 cubic yards of sand had been removed from the premises and the value of this amount of material far exceeded $2,000 and a great amount of money was expended in this litigation the Supreme Court refused to render a decision. This court said:

We cannot perceive that the fact that many thousand cubic yards of sand and gravel had been removed from the property during a four-year period justifies the conclusion that the right presently sought to be enforced by plaintiff exceeds $2,000."

Burden on Employee

According to a recent higher court, an employee who suffers from the disease silicosis must prove to the satisfaction of the court in whose employment he contracted the disease. Otherwise he cannot recover any compensation.

For illustration, in *Perez v. Columbia Granite Company,* 62 Atl. (2d) 658, it was shown that a state law provides that the employer in whose employment the employee was last injuriously exposed 60 days or more to the hazard of silicosis must pay compensation to the employee. The testimony disclosed these facts: A man named Perez was employed as a stone cutter since 1914. He worked as a stone cutter for the Joseph Coduri Granite Company during three separate periods, as follows: From August 21, 1942, to May 29, 1943; from June 16, 1944, to November 24, 1944; and from May 24, 1946, to December 24, 1946. His separation from employment on

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each of these occasions apparently was voluntary and not brought about by any known illness or accidental injury. Later he was employed as a stonecutter by the Columbia Granite Company. He continued with that company when he became ill and was unable to assume work. After certain examinations by doctors and the taking of X-rays at a hospital, he was found to be disabled from silicosis, which disablement was *total,* according to his own doctor.

The question presented the court was: Is the Columbia Granite Company or Joseph Coduri Granite Company liable for payment of compensation to Perez?

The higher court refused to decide which is liable, saying that it was the employee's duty to prove that his illness resulted from exposure to the hazard of silicosis for 60 days during his employment and with which company he was exposed for 60 days or more. This court said:

"Conceivably an employee might work for an employer only one day when the accumulating effects of previous exposure to silica dust during many years of employment by different employers would finally have brought about his actual disablement."

Control Is Important

A great deal of legal controversy has resulted where an employer loans an employee to another and this employee negligently effects damage. The difficult question always is: Which employer is liable for the damages caused by the employee? This important question was clearly answered in the outstanding and late higher court decision, *American Telephone & Telegraph Company v. Ohio Valley Sand Company,* 50 S. E. (2d) 884. In this case the American Telephone and Telegraph Company sued the Ohio Valley Sand Company to recover damages for the destruction by the former's transmission lines across a river. The testimony showed that the Ohio Valley Sand Company owned a floating nonself-propelled derrick with a boom 80 feet long. This derrick was being towed down the river with the boom in practically a vertical position when it struck the telephone wires with the resultant damage cost $6,800.00 to repair.

Further testimony showed that the Ohio Valley Sand Company had leased the derrick to Harman Company which paid *as rental* a royalty on the tonnage basis. Also, the Ohio Valley Sand Company paid the engineer, fireman and watchman who worked on the derrick *at the time* it damaged the telephone wires.

The court held that the answer to the question as to whether the Ohio Valley Sand Company or the Harman Company was responsible for the damaged wires depended solely upon who the legal employer was of the engineer, fireman and watchman. In this respect the court held that the jury must decide.

This court explained that the test for determining the status of an employee is whether he is subject to direction and control of his general employer or to direction and control of the person to whom he has been loaned. In other words, the *one who controls the employee is the legal employer* and responsible for the employee's negligence. Judge Haymond said:

"In my opinion this rule applies to the undisputed facts disclosed by the evidence which shows beyond question that the engineer at the time the boom struck and damaged the transmission wires was subject to direction and control of the defendant (Ohio Valley Sand Company) . . ."

Obviously, therefore, in view of this new and outstanding higher court decision, one who loans or leases equipment to another may avoid *all* responsibility for negligence of employees also loaned to operate the equipment by having the lessee assume *full* control over these employees.

Seller Deceives Buyer

Modern higher courts consistently hold that a seller is liable in damages to a purchaser who is *deceived* into believing that he is purchasing a new machine when in fact the machine is used.

For example, in *Gomil Company v. Lingold,* 209 S. W. (2d) 205, a purchaser sued the Gomil Company for damages. The purchaser testified that a salesman for the Gomil Company fraudulently represented to him that a certain machine was a new and unused, whereas, the truth was that the machine

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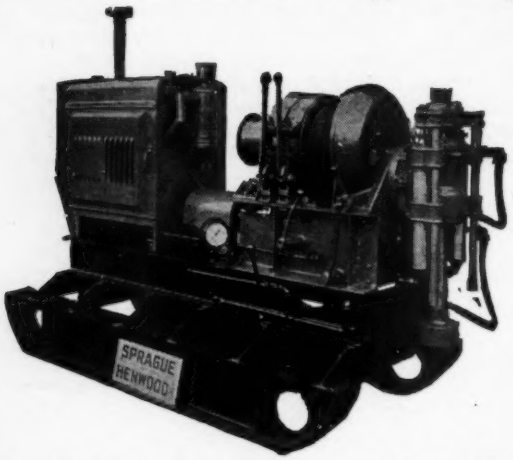

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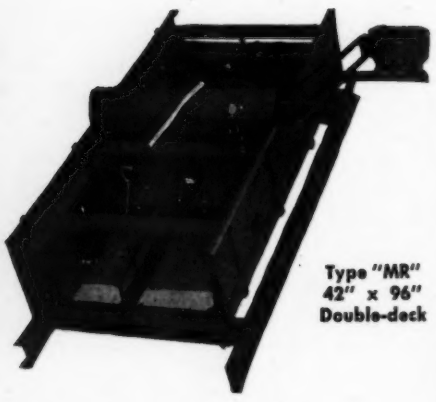

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had been used.

The higher court held in favor of the purchaser although the seller argued that other papers may be used as evidence to prove his innocence. This court said that proof that the purchaser was induced to believe he was buying a new machine, whereas he was actually buying a used one, would justify a judgment that the purchaser sustained a pecuniary loss, and therefore entitled to damages.

Not Dangerous

Generally speaking, an employer can *avoid* damage liability to an injured or killed employee if he proves that the thing that caused the injury was not a dangerous instrumentality.

In *Henrie v. Rocky Corporation,* 196 Pac. (2d) 487, a state law was litigated which in effect provides that an employee injured or killed while in any place of employment "dangerous or prejudicial to his life, health, safety or welfare" may recover *damages* in addition to compensation under the State Workmen's Compensation Act.

An employee named Henrie was killed by electrocution when operating an elevator. His dependents sued for damages *in addition* to the compensation. The higher court *refused* to award damages, saying:

"The mere existence of defects in the electrical circuit of defendant's (employer's) elevator did not thereby render the plant a place of employment dangerous to the life, health, and safety of Henrie."

"Attractive Nuisance"

All higher courts agree that owners of real property are legally obligated to eliminate from their premises certain dangerous things which are "attractive" to children. These things are termed legally "attractive nuisances." If a child is injured or killed on or near an attractive nuisance the property owner is liable; otherwise he is not liable. This is so because the general rule is that an owner of land has *no* obligation of care to protect trespassers, whether adults or children.

For illustration, in *Peers v. Pierre,* 83 N. E. (2d) 20, the testimony showed facts, as follows: The Pierre Sand and Gravel Company owned about ten acres of land in a village. Up to five years before this time sand and gravel had been dug from the land. The result was that there were several sand and gravel hills and excavations on the property. Water had entered into the excavations, forming ponds.

A boy 7 years old lived about one block from these ponds. One day he was seen playing about the pond with other boys older than himself. Later he waded in the pond up to his chest. He was not seen again. Search for him all through the night was unsuccessful. In the morning the police dragged the pond and found his body.

The boy's parents sued the sand and gravel company for damages.

During the trial this testimony was given: The proprietor of the company knew that boys habitually played in and about the ponds and that they threw stones and small sticks therein. Also, the proprietor knew that boys swam in the ponds and "played boats" with the sticks. It was contended that the company was liable for death of the boy because the proprietor knew that the ponds were "attractive" to children and he did nothing to make the place safe nor to prevent the boys from playing there. Also, it was argued that the proprietor had the duty to fence the property in or to guard it so that small children might not be harmed. Nevertheless, the higher court refused to hold the company liable in damages for death of the boy, and said:

"Viewed in the light most favorable to plaintiff we cannot say that there was any unusual danger of the pond. . . . The debris consisting of small sticks with which the boys played does not alter the case. . . . We are satisfied that the pond in which the decedent, William Peers, was drowned was not an attractive nuisance."

For comparison, see *Barnhart v. Chicago,* 154 Pac. 441. Here a boy 8 years old was drowned when he fell from a raft into a pool. The higher court refused to hold the property owner liable saying that the "attractive nuisance" doctrine does not apply to ponds, where there is no unusual danger. This court also explained that no one can deny that a pool of water is attractive to boys,

but it is not a dangerous agency so as to come within the doctrine of attractive nuisances, because the number of deaths in comparison to the total number of boys visiting ponds for purposes of playing, fishing and swimming is comparatively small.

Question and Answer

Question: We cannot locate a clipping from your department concerning claims for damages resulting from wash water from a sand plant being discharged into a creek along which owners hold riparian rights. Can you help us? T. V. S. & G. Co.

Answer: Responsive to your letter of March 21, I take pleasure in citing to you *Destimone v. Mutual Materials Company,* 162 Pac. (2d) 808, reported January, 1946. Here it was shown that a property owner sued the Mutual Materials Company for damages to his crops and land caused by discharging water and sand on his land.

The higher court held the company fully liable, saying that the evidence sustained a judgment of $149.25 for damage to bean crop, $99.25 for damage to pea crop, $61.75 for damage to corn crop and $300 for damage to tomato crop.

Again see 147 Pac. (2d) 945, where a farm owner sued a company for damages to his crops caused by the latter diverting water and sand. The lower court held the company liable. The higher court indicated liability saying:

"There is ample evidence to sustain the decree of the trial court that the crops on the land owned were damaged by the appellant's wrongful discharge of waters and sand thereon."

Also, this court explained that in cases of this kind the proper measure of damages for the loss of a growing crop or valuable land is the actual value of the same at the time of the loss. This value may be ascertained either by evidence showing the reasonable value of the crop or land at the time of the loss, or the market value at the time of maturity, less the cost.

And again see *Clifford v. State,* 148 Pac. (2d) 302, where a property owner sued a company to recover $25,000 damages alleged to have been caused by unlawful encroachment upon his property.

The counsel for the company admitted encroachment upon the property but denied damage in the amount of $25,000. The jury inspected the property and also listened to the testimony of three experienced realtors and appraisers who were familiar with real estate values. These three witnesses testified that the property was worth $35,000 and that the depreciation in value resulting from the encroachment upon the property was $10,000.

The jury gave judgment to the property owner for $10,000, instead of the desired $25,000. The higher court upheld the verdict.

And again see *United States v. Commodore, Inc.,* 143 Fed. Rep. (2d) 720.

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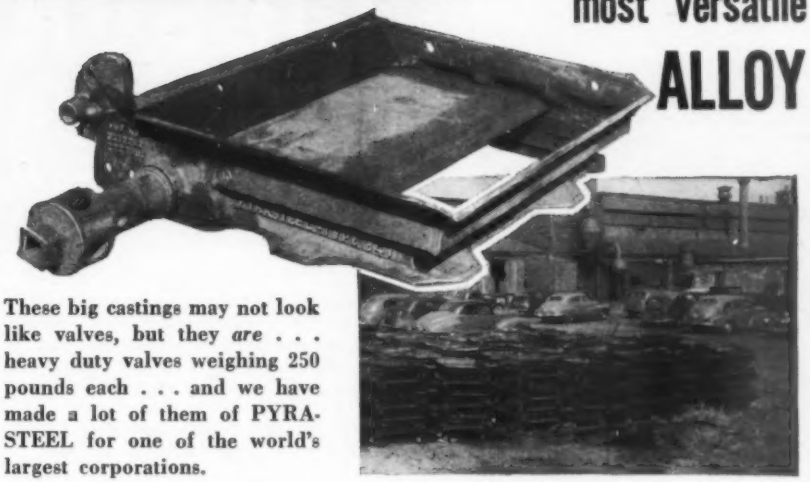

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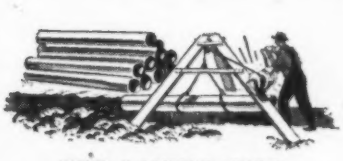
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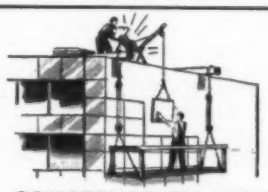
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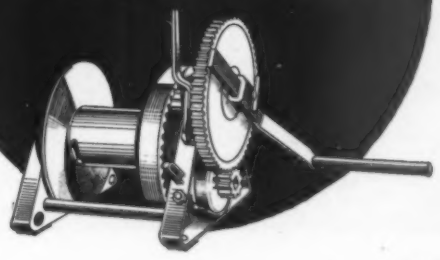
THE JOB'S A CINCH . . . WITH HANDIWINCH



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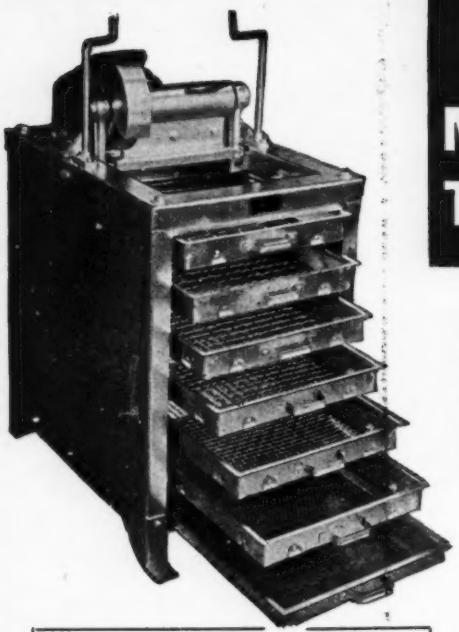

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Here it was shown that certain improvements by the United States government of the navigability of the adjacent water damaged a corporation.

The higher court allowed the corporation damages equal to its financial losses. This court said:

"While Congress, in the exercise of this power, may adopt any means having some positive relation to the control of navigation, it may not arbitrarily destroy or impair the rights of riparian owners by legislation which has no real or substantial relation to the control of navigation or appropriateness to that end. This riparian right is property and is valuable . . ."

General Portland's Expansion Ups Output and Earnings

According to the annual report of the General Portland Cement Company, the firm's $4,000,000 two-year expansion and improvement program, now nearing completion, has increased its annual cement-producing capacity by approximately 2,265,000 barrels.

This expansion, which upped the total annual productive capacity from 6,635,000 barrels early in 1947 to about 8,900,000 barrels early in 1949, has contributed substantially to the company's — and stockholders'—increased earnings, stated Smith W. Storey, General's president.

In embarking on and continuing with the improvement program, upon which approximately $1,600,000 was spent in 1948, the report points out, General Portland Cement Company anticipated an increased demand for its products, an expectation which materialized.

Further expenditures, chiefly for the improvement of properties and efficiency in operation, are planned for 1949, Mr. Story stated. It is contemplated that these expenditures (approximately $1,100,000) will be financed from company funds on hand and funds earned from the current year's operation.

Lime Spreader Bodies

(*From page* 105)

4 in. The locking mechanism is of the eccentric type and has a positive close. A flanged door keeps material from leaking through. This feature can be incorporated in present Baughman bodies.

Shown at the *lower right* (*p.* 105) is the Flink Company spreader. In this unit adjustable chutes compensate for the difference between wet and dry lime, thus eliminating both bare and heavy spots and giving a spread of uniform thickness. The top agitator is designed with a 1¼-in. up-and-down stroke and ½-in. in-and-out stroke to prevent budging. After initial installation, this unit can be interchanged with an original endgate of a dump truck or grain box in about five minutes. A phosphate spreader attachment is available. This attachment lays phosphate uniformly at a 1-ft. width.

traffic news

CENTRAL TERRITORY RAILROADS FREIGHT TRAFFIC COMMITTEE

Docket 86859 (1)—Proposed to establish a rate of 172 cents per net ton on stone, crushed, in bulk, in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply from Findlay, O., to Jonesville, Mich.

Docket 86861 (2)—Establish on slag, expanded (construction material aggregate) carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply, but not less than 80,000 pounds, from Chicago, Ill., and points in the Chicago Switching District to Louisville, Ky., 265 cents per net ton.

Docket 86863—Proposed to establish on crushed stone in bulk, stone tailings in bulk, agricultural limestone (unburned) in bulk, stone screenings in bulk; carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply from Monon, Ind., to Lafayette, Ind., 70 cents per net ton.

GENERAL FREIGHT TRAFFIC COMMITTEE EASTERN RAILROADS

Bulletin G-153—Stone, fluxing, foundry or furnace, melting or refractory (unburned), in bulk, carload minimum weight 90 percent of marked capacity of car, etc., from Carey, O., to Ottawa, Ill., $3.41 per gross ton in open-top cars and $3.74 per gross ton in closed cars. Rates include ExParte 162-B and 166-C increases, but are subject to Tariff of Emergency Charges X-168. Reason: Comparable with rates applying to other points.

Bulletin G-155 (shippers)—Stone, fluxing, furnace or foundry, melting or refractory (unburned), in bulk, carload minimum weight 90 percent of marked capacity of car, etc., from Scioto, O., to Charleston, W. Va., $2.68 per gross ton in closed cars, $2.10 per gross ton in open-top cars; and to Huntington, W. Va. $2.65 per gross ton in closed cars and $2.10 per gross ton in open-top cars including ExParte 162-B and 166-C increases, but subject to Tariff of Emergency Charges X-168. Reason: Comparable with rates applying from and to other points.

Bulletin G-156—Crushed stone having value for construction purpose only and not suitable for agricultural or chemical purposes in bulk in open-top cars, carload minimum weight 90 percent of marked capacity of car used, from Greenfield-Thrifton, O., to points on B.&O. R.R., viz.: Parkersburg, W. Va., $1.77; Clarksburg, W. Va., $2.21; Swanton, Md., $2.49; Piedmont, W. Va., $2.54 per net ton; and various other points in the states of West Virginia and Maryland. Rates shown include ExParte 162-B and 166-C increases, but are subject to Tariff of Emergency Charges X-168. Reason: On same basis as rates applying from and to other points.

GENERAL FREIGHT TRAFFIC COMMITTEE EASTERN RAILROADS

Bulletin G-165—Lime, in bulk or in packages, as provided for carload shipments in Southern Classification, minimum weight 30,000 pounds, carload (See note below); Lime, in bulk or in packages, as provided for carload shipments in Southern Classification, straight or mixed, minimum weight 50,000 pounds, except as noted (See note below). Note: If the carload charge based on the higher rates at actual weight (but not less than the minimum weight specified for the higher rate) exceeds the charge based on the lower rates at actual weight (but not less than the minimum weight specified for the lower rate), the latter charge will apply.

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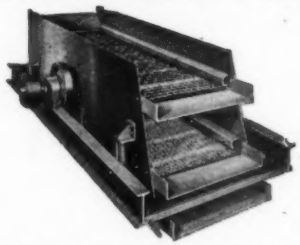

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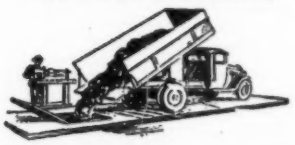

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Woodsboro, Md.		
York, Pa.		
Keller, Md.		
Thomasville, Pa.		
Bellefonte, Pa., Group Points		
Bellefonte, Pa.		
Chemical, Pa.		
Pleasant Gap, Pa.		

Rates include ExParte 162-B and 166-C increases, but are subject to Tariff of Emergency Charges X-168. Reason: Comparable with rates applying from and to other points.

ILLINOIS FREIGHT ASSOCIATION DOCKET

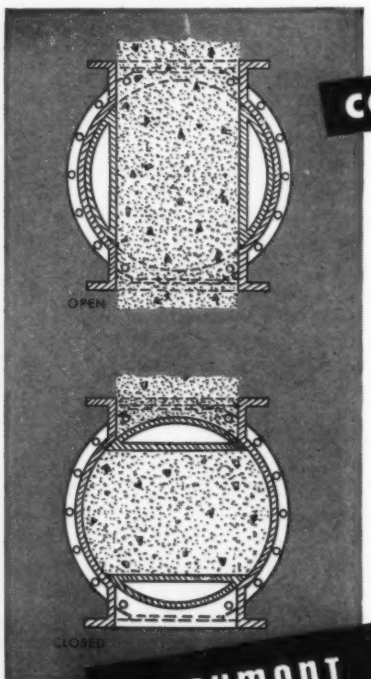
Docket IRC 511-809—Proposed to establish on agricultural limestone, carload, in open-top cars, minimum weight marked capacity of car, except that when car is loaded to full visible capacity actual weight will apply, from McCook, Ill., to Congerville, Ill. Present: Class or combination. Proposed: Basic $.17 per net ton, X-162; $1.32 per net ton, X-166; $1.45 net ton. Subject to X-168 increase.

Docket IRC 511-810—Sand (other than blast, core, filter, fire, glass, furnace, loam, grinding, molding, polishing or silica), in open-top cars, minimum weight 90 percent of marked capacity of car the actual weight but in no case less than 40,000 pounds will apply, to Galva and Kewanee, Ill., from Briar Bluff, Ill. (See table below.)

A barrel of cement weighs 376 lbs., but the "barrel" (except sometimes for export) consists of four bags with a net weight of 94 lbs. each. The bags at one time were practically all made of cotton; nowadays heavy paper is the preferred material.—*The Lawrence Dragon.*

To	Basic	Present 162-A	166-B	Basic	Proposed 162-A	166-B
Galva, Ill.	88	103	113	77	92	101
Kewanee, Ill.	97	112	122	88	103	113

Rates in cents per net ton.



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THAT DOESN'T CLOG

Because the material in the gate body rotates with the machined rotor to cut off flow, Beaumont Rotary Gates are always easy to open and close. And, when the gate is open, there is no restriction to flow since the rotor opening is the same diameter as the pipe.

Beaumont Rotary Gates are quick acting, dust-tight and can be used at any angle for such fine materials as soot, cement and lime. They are made from any practical material—stainless steel, aluminum alloy, cast iron, nickel, etc. in sizes ranging from 4" to 12".

Many types of plants throughout the country are finding it economical to standardize with Beaumont Rotary Gates. Why not do the same? Request complete information.

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WEIGH WHILE YOU CONVEY

Be sure of your production figures in belt conveying bulk materials. Ideally suited for all producers of lime, cement, sand, gravel and other bulk materials that require handling by belt conveyor.

The Merrick Weightometer accurately and automatically weighs and records a continuous flow of material passing over the conveyor belt without any interruption to the conveyor operation.

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IT COSTS NO MORE — TO USE THE BEST

REPLACE WITH "Indian Brand"

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ESTABLISHED 1881

Natl. Gypsum Co. President Sees Benefit in Building Lag

Sales and net earnings of the National Gypsum Company during the first quarter of 1949 will be about the same as those reported in the corresponding period last year, according to President Melvin H. Baker. During the first three months of 1948, National Gypsum listed sales of $15,388,000 and earnings of $1,521,000.

Mr. Baker pointed out that activity in the building and construction industry has fallen below last year's record highs, although dollar volume of all construction still is about 14 percent above that of the same period past year. Construction of new dwelling units during the first two months of 1949, however, has fallen sharply from the same period a year ago, he added.

"This lag in new residential construction," Mr. Baker declared, "does not represent any lessening in demand for new homes. Instead, it shows strong resistance to the high cost of construction and an uncertainty over government policies affecting capital investment."

"Because of this lag, use of our products has fallen under the high of last summer and fall. However, this has given our dealers an opportunity to put stock in warehouses which have been bare for the last three years. Today, except for shortages of gypsum lath in the South and Northwest, our dealers are in a position to make prompt deliveries not only of the many materials we make but of all other items required for standard construction."

Standards Bureau Reports On Hydrated Lime Expansion

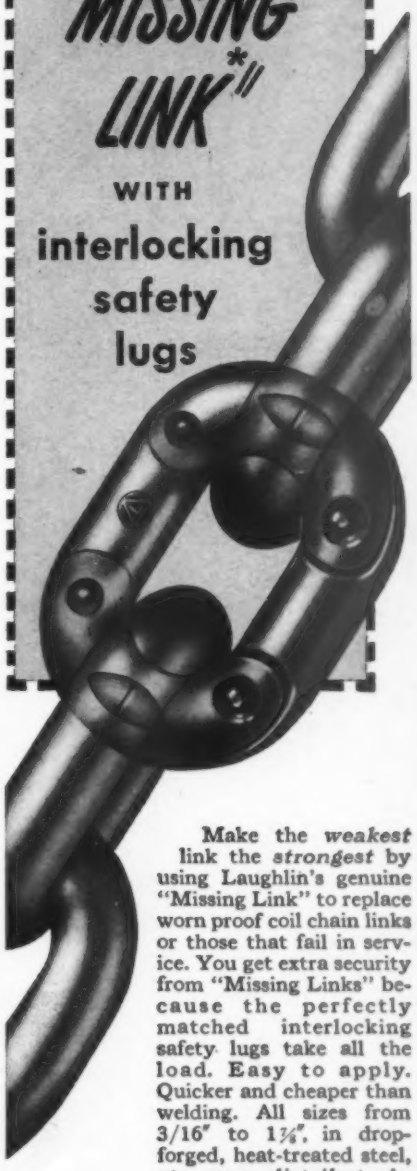
Among the publications of the National Bureau of Standards issued during January, 1949, is a report on *Expansive Characteristics of Hydrated Lime and the Development of an Autoclave Test for Soundness,* prepared by Lansing S. Wells, Walter F. Clarke, and Ernest M. Lovin.

This bulletin is an explanation of a technique for preparing, curing and autoclaving 1- by 1- by 10-in. cement-lime bars and the determination of the expansive characteristics of 80 commercial hydrated limes. From criteria set forth for determining the soundness of hydrated limes, a test is proposed with a suggested limit of expansion of 1.0 percent.

Net profit of Gypsum, Lime and Alabastine, Ltd., Toronto, Canada, for the year ended November 30, 1948, after all charges, including income taxes of $804,300 and for the first time provision of $125,000 for fluctuation in inventory values, are reported at $1,155,174, or $2.63 per share, as compared with $848,416, or $1.93 a share for the previous fiscal year. The gain amounted to 36 percent. The improved net profit position is largely the result of increased sales volume and modernization of plants.

Stronger than the chain itself!

THE LAUGHLIN "MISSING LINK*" WITH interlocking safety lugs



Make the *weakest* link the *strongest* by using Laughlin's genuine "Missing Link" to replace worn proof coil chain links or those that fail in service. You get extra security from "Missing Links" because the perfectly matched interlocking safety lugs take all the load. Easy to apply. Quicker and cheaper than welding. All sizes from 3/16" to 1⅜", in drop-forged, heat-treated steel, at your distributor's. Write for Catalog #145 . . . industry's data book of fittings. THE THOMAS LAUGHLIN COMPANY, DEPT. 3, PORTLAND 6, MAINE.

*Reg. U. S. Pat. Off.

LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS

Safety Slogans Featured By Leading Cement Concerns

Gleaned from the National Safety Council *News Letter* are these 1949 safety items collected by the Council from various nonmetallic mineral producers:

The Lone Star Cement Corporation conducted a system-wide employee contest for its safety slogan of the year. The winning slogan reads: "No accident here throughout the year."

The Oro Grande, Calif., plant of the Riverside Cement Company is featuring "Safety all the time in '49" as its current slogan.

At Ideal Cement Company operations employees are urged to "Keep everyone feeling fine with no accidents in '49."

"Hold the safety line in '49" is the Portland Cement Association's safety plug for this year.

Queries the National Safety Council: "What's yours?"

Two Dominions to Develop Christmas Island Phosphate

What is said to be the third-largest known deposit of phosphate rock in the world, located on Christmas Island, south of Java, is to be exploited jointly by Australia and New Zealand. So far as is known, only Nauru and Ocean Island have larger resources of phosphate.

The two dominions reportedly bought rights of development for $11,000,000 in a transaction with the Christmas Island Phosphate Co., Ltd. Deposits are thought to aggregate 30,000,000 tons. Australia and New Zealand use a total of about 1,250,000 tons of phosphate rock annually.

New Regulations Announced For Phosphate Development

C. Girard Davidson, assistant secretary, United States Department of the Interior, has announced new regulations for exploration, development and production of phosphate deposits.

Under the new regulations two types of leases are mentioned—a noncompetitive lease to promote work on unexplored areas, and a competitive lease for development of areas known to contain commercial phosphate deposits, or in which there is competitive interest. Although the new terms permit larger tracts to be leased, no person, association or corporation may hold at one time more than 5,120 acres in any one state or more than 10,240 acres in the nation.

Fire which started in a stack of cement bags caused damage amounting to $10,000 to the Monolith Portland Midwest Cement Company's plant four miles south of Laramie, Wyo. The blaze swept the fourth floor of the plant, destroying supplies valued at $5,000 and causing $5,000 damage to the building, officials stated.

First Crude Feldspar Beds Discovered in New Jersey

Location of deposits of feldspar in the mountainous regions of New Jersey has been announced by the Bureau of Mineral Research at Rutgers University. While New Jersey is one of the centers of the nation's ceramics industry, no crude feldspar has thus far been produced in the state.

The Rutgers geologists, after examining 100 areas, found 11 large deposits in New Jersey. The most promising of these was at Scotts Mountain, about six miles west of Washington, N. J., with between 100,000 and 500,000 tons. A larger deposit, estimated at 900,000 tons, was located a mile south of Franklin, in Sussex County, but the presence of quartz and other minerals would require a larger investment, it was said.

Decline Noted in '48 Awards For Highway Construction

Highway construction contract awards declined more than 5 percent in 1948 while the cost of road projects increased during the same period, according to Charles M. Upham, engineer-director of the American Road Builders' Association.

"Figures of the Public Roads Administration indicate that 10,206 awards covering 40,115 miles of highway construction were made during 1948, as compared to 10,825 awards for 44,918 miles of highway construction during 1947," Mr. Upham said.

PIT AND QUARRY

Research Department

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☐ Asphalt Mixers
☐ Bag Filling and Weighing Machinery
☐ Bags, Cloth
☐ Bags, Paper
☐ Balls, Steel
☐ Barges, Steel
☐ Batching Equipment
☐ Belt Dressing
☐ Belt Fasteners
☐ Belting, Conveyor and Elevator
☐ Belting, Transmission
☐ Belt Tighteners
☐ Bin, Gates
☐ Bins
☐ Blasting Powder
☐ Blocks, Friction
☐ Bodies, Motor Truck
☐ Buckets, Clamshell
☐ Buckets, Conveyor and Elevator
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☐ Cement Colors
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NEWS OF CONCRETE MANUFACTURERS

Concrete Products Assn. Of Washington Holds Annual Spring Meeting

Members of the Concrete Products Assn. of Washington gathered at the Associated General Contractors' Lounge in the Arctic Bldg., Seattle, on March 12 for the annual spring meeting of the organization. Preliminary plans for the reorganization of the association on greatly expanded lines were discussed and further progress is expected to be announced at the summer meeting.

R. M. Gilmore, safety consultant, addressed the group on *The Cost of State Industrial Insurance.*

J. J. Wegner reviewed progress being made on the pumice research program, and an irrigation pipe study was outlined by J. A. Roberson. Mr. Wegner and Mr. Roberson are attached to the Division of Industrial Research, Washington State College. A discussion on the various methods of concrete-pipe manufacture was led by George P. Duecy, association president. Mr. Duecy is one of the owners of the Associated Sand & Gravel Co., Everett.

Some of the members who attended the annual convention of the National Concrete Masonry Assn. at Cleveland gave extemporaneous accounts of what transpired during the gathering. Among those who made the trek eastward for the meeting were Mr. Duecy, Verne Frese and Harold Lutes (Layrite Concrete Products Co.), Fred Kettenring (Greystone Concrete Products Co.), and Charles Delling.

Smithwick Acquires Control Of Insul-Lite Block & Supply

According to an announcement released by S. Carl Smithwick, president of Insul-Lite Block & Supply, Eugene, Ore., he has acquired control of the company, which will be known hereafter as Smithwick Block & Supply.

This firm, which also operates a plant in Portland, Ore., manufactures pumice block, made from pumice mined at Bend and cement shipped from the Pacific Portland Cement Co. at Gold Hill.

Mr. Smithwick states that the Eugene plant will be operated on two shifts per day. Several large construction projects in this area will employ the lightweight pumice units during 1949.

Before joining Insul-Lite, Mr. Smithwick was district engineer with the Portland Cement Association at Spokane, Wash. Other officers of the firm are Lane W. Wilcox, vice-president, and Ed DeKeater, in charge of sales and promotion. Mr. Wilcox was formerly sales manager of Insul-Lite. In addition to his duties as vice-president of the newly-organized concern, he will act as assistant general manager in active charge of all operations. Carleton G. Smithwick, formerly plant superintendent of the Portland plant, who is now completing his law studies, is scheduled to become production manager at Eugene.

• Busiest salesman for the Universal Concrete Pipe Company, Columbus, O., during the last year was William Curtiss of the home plant. Mr. Curtiss (right) is shown as he receives a $25 check from Thomas Monaghan, general sales manager, for making the most calls during 1948. Curtiss topped all salesmen in Universal's 15 plants.

Montreal Firm Purchases Two Concrete Concerns

Dominion Building Materials Limited announces the purchase of Ready Mix Concrete Limited of Montreal and Ontario Ready Mix Concrete Limited of Ottawa.

The firm will carry on business at 5035 Western Avenue, Montreal, and Dalhousie Street, Ottawa, under the name of Dominion Building Materials Limited. This announcement was released by D. Leamy, manager.

A firm to manufacture and erect concrete silos and grain bins has been organized at Alexandria, La., by T. W. Thompson. Known as the Alexandria Concrete Silo & Bin Company, the firm will have its main offices in Alexandria and its plant at Boyce, La. Charlie Spain of Memphis, Tenn., who was formerly connected with a similar concern in that city, will be in charge.

Coming Events

June 27 - July 1, 1949 — Atlantic City. Fifty-second annual meeting, American Society for Testing Materials, Hotel Chalfonte-Haddon Hall.

Dravo R.M.C. Drivers Get Inside Information— For Higher Job I.Q.'s

Dravo Corporation's "ambassadors on wheels," the drivers who operate a fleet of 30 trucks delivering ready-mixed concrete in Pittsburgh and western Pennsylvania, are getting a thorough indoctrination in company policies and customer relations in a new 34-page, two-color booklet titled, *Your Job at Dravo.*

The booklet was prepared by the company's Keystone Division for presentation to drivers joining the organization. The attractive format and breezy style found favor, too, with the drivers already in the employ of the division.

An entire chapter is devoted to a simplified explanation of concrete mixing technique, giving the driver a fundamental knowledge of the various types of concrete mixes and their application. More than 30 cartoons, most of them on a humorous slant, are used to illustrate various subjects discussed in the booklet.

53rd Anniversary of Founding Observed by Borchers Bros.

Fifty-three years of successful operation were celebrated by The Borchers Brothers Building Materials, Concrete & Fuel Co. at San Jose, Calif. Starting back in '96 with two trucks for hauling rock, sand and gravel, the firm now operates one of the largest and most modern concrete batching plants in the West.

From its 7-acre plant, more than 20 transit-mix trucks and 30 other trucks carry the company's product throughout the area. At present 15 cu. yds. of concrete are produced every two minutes, and three trucks can be loaded simultaneously.

R. H. Borchers, who founded the business at the age of 19, has now retired. The firm was the first between San Francisco and Los Angeles to sell cement, sand, rock and gravel. In 1912 the first truck was placed in operation. Since death of George Borchers and the retirement of R. H. Borchers, the company has been operated under the direction of A. W. Caldwell and Marguerette V. Chase. Mr. Caldwell is plant manager.

Bremerton Concern Pioneers In Concrete Pipe Production

A new industry at Bremerton, Wash., is the concrete tile plant of Bremerton Concrete Products, first concern to manufacture this type of product in this area.

Machinery has been set up and 4- and 6-in. tile is being turned out. If demand justifies, additional equipment will be installed for making pipe up to 12 in. in diameter, one official stated.

$50,000 Expansion Program Triples Universal Output At Decatur, Ala., Plant

Production capacity of the Universal Concrete Pipe Company plant at Decatur, Ala., has been tripled through a recently-completed $50,000 expansion program.

George D. Sims, plant manager, conducted an open house and dinner meeting for city, county, state and company officials when the improvement project was completed. Principal speaker was H. G. McClusky of the Alabama Highway Department. A motion picture showing the uses of concrete block was shown after the dinner at a nearby Decatur club.

A few days later, Mr. Sims was host to a group of more than 30 brick masons who were guests of Universal for an inspection visit.

Kentucky Companies Build Concrete Plants in 2 Cities

Two Kentucky communities were recently chosen by concrete companies for their new plants. At Richmond the Kentucky Ready Mixed Concrete Company, a subsidiary of the parent concern in Lexington, began full-scale production of ready-mix, which is delivered to jobs within a 15-mile radius. Gilman Robertson, co-owner of the company, heads the Richmond operation. Eugene Sears is yard manager.

A new plant is replacing the old facilities of the Kentucky Concrete Pipe Company at Louisville. W. M. Lafferty, manager, stated that the new $25,000 building would be completed by July. The controls will be entirely automatic, Mr. Lafferty added.

Milwaukee Concern Produces Concrete Flooring Planks

Vander Heyden, Inc., Milwaukee, Wis., is making "concrete flooring" in addition to its line of concrete masonry blocks. The "planks," made under the Dox Block System patents, are turned out in units up to 17 ft. in length. At present the "plank department" has a capacity of 1,600 sq. ft. per 8-hour day, and with new equipment the output will soon be doubled, said officials. Vander Heyden's process employes Waylite aggregate, following the patented process of the Waylite Company.

The "planks" are in high demand because of their fireproof and termite-proof characteristics, and also for their acoustical and insulating features.

Three Besser block machines are producing 28-lb. 8-in. blocks at the rate of 2,000 units per hour. The plant consumes nearly four carloads of cement per week.

The Biloxi Concrete Products Company has announced that it is open for business in its new location at Oak street and Railroad avenue, Biloxi, Miss. This firm features wide mortar joint blocks made on vibrated and presspack machine; it also offers sand, gravel, cement, waterproofing paint, and mortar mix.

• The Big Pour—a scene in the new Ivanhoe Road plant of the Perfection Stove Company, Cleveland, O., showing Collinwood Shale & Brick Company's crew pouring a load of ready-mixed concrete for the plant's floor. When the photograph was taken, enough ready-mix had been poured to build a pavement 60 miles long, 5 feet wide and 4 inches deep. Much of the ready-mix also went into the construction of footers under the buildings and into casing for steel supporting columns.

$100,000 Slab Facilities Opened in Houston, Tex., By George Rackle & Sons

George. Rackle & Sons Co., Cleveland manufacturers of concrete roof decks and floor slabs and cast stone, has opened a branch plant in Houston, Tex. Completion of the $100,000 plant was announced by George P. Rackle, executive vice-president of the company and general manager of the Houston branch.

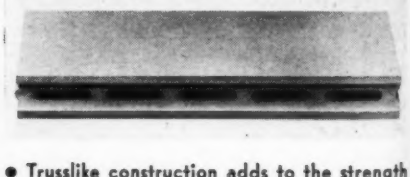
The plant has a 100-cu. yd. aggregate capacity set-up. It will turn out slabs of standard 2-ft. width or less, in varying thicknesses, of any desired length. Both flat and channel slabs will be manufactured at the plant. The slabs, manufactured with Featherlite, a lightweight aggregate produced from the Strawn shale in Palo Pinto County, range in weight from 10 to 16 lbs. per sq. ft.

The Rackle company, established in Cleveland in 1870, initiated the manufacture of concrete roof decks and floor slabs in 1925. The firm is a charter member of the Cast Stone Institute. The Houston branch is the first established by the company during its 79 years of existence, its products previously having been shipped from Cleveland to all parts of the United States.

Marietta Concrete Corporation Producing New Silo Stave

The Marietta Concrete Corporation of Marietta, O., with plants at Baltimore, Md., and Charlotte, N.C., has recently placed on the market a new air-cell concrete stave which, when used in the construction of farm silos and industrial storage bins, not only helps through air insulation to prevent freezing but provides greater strength with less weight.

It is believed by Frank Christy, president of the company, that the new stave will revolutionize the concrete silo and industrial storage bin industry.



• Trusslike construction adds to the strength of the stave.

Developed after 13 years of research, the new stave is 4 in. thick, as compared to the conventional 2½-in. thick solid stave, and weighs about one-third less. Each stave has five air cells which provide air insulating qualities. Because of its unique construction, the stave can be tamped from all sides, with a great resulting density.

Advantages of the new and stronger stave will be readily apparent to the users of industrial bins and silos. Because of the stave's extra density of material and its truss-like construction, a storage bin or silo built with the new Marietta Air-Cell stave will offer greater resistance to inside pressure exerted by stored materials and give better control of heat and cold.

Stearns Mfg. Co. Names Concrete Products Supply Minneapolis Distributor

The Stearns Manufacturing Co., Inc., has recently appointed the Concrete Products Supply Co. of 425 North 7th Street, Minneapolis, Minn., as distributors of Stearns block-making equipment in Minnesota, North Dakota, South Dakota and northern Iowa.

The Concrete Products Supply Co. was organized in 1947 to serve the concrete products plants in the area. Don Lang and LeRoy Nelson, the owners, are thoroughly familiar with the problems confronting the concrete products manufacturer. Both men served for several years as field editors for a Northwest construction and engineering publication. During this time, they gained a wide acquaintance not only with block manufacturers in the area, but with architects and builders as well.

Both Mr. Lang and Mr. Nelson will spend a large part of their time in the field and expect to call on all of the concrete products plants in their territory at least every 30 days.

Blaze at Minnesota Plant Causes Damage of $10,000

A fire which followed the explosion of an oil heater injured Lloyd Bernard, an employee of the Elk River Concrete Products Company at Austin, Minn., and caused damage amounting to $10,000 at the plant.

The injured man stated that the heater exploded when he pulled an igniter switch on the control. A few minutes after he had dashed outside, the flames leaped upward through the roof. Although the blaze was brought under control within 20 minutes, the fire destroyed the southeast corner of the building. Carl Schmeiling, superintendent, said that some small equipment was lost and wiring was heavily damaged.

Indiana Block Firm Awarded Big U.S. Housing Contract

J. E. Evans Concrete Products, Inc., of Shelbyville, Ind., reports that a major contract has been obtained to furnish approximately 285,000 concrete units for a government housing project involving the erection of 500 low-cost dwellings near Indianapolis. The contract includes 20,000 stepping stone blocks, a fact which has necessitated the establishment of a new department at the plant.

Paul Welsh, president and owner of the firm, states that this order will represent approximately 30 percent of the plant's total output during the current year, leaving an ample supply for the local market.

Peter Van O. Barkelew, who was a salesman for the Whitehall Cement Manufacturing Company, Philadelphia, died recently in his home at Moorestown, N. J. Mr. Barkelew was 63 years of age.

I DON'T KNOW MUCH, I'M JUST A BEGINNER . . .

So when we got our new pipe machine, I discovered that to lay sewer pipe sometimes you had to turn corners and go around bends. The man said when he sold me the contraption he didn't have any equipment to make fittings. I didn't know just how important that little item was. I learned.

First we tried to buy something that would make "fittings"—well it seems they don't make many any more; so Vinz, my foreman (he's a beginner, too), made a masonry saw—works, too—cost $125—to cut pipe on an angle and mud 'em together for 45-degree and 90-degree bends. I figured we could use it for other things. Good thing I can! About a month later Vinz discovered that a $1.98 hand saw could be used just as effectively on the pipe when placed three hours old in a miter box. Imagine what a beginner can get himself to spend his money for!

45-degree and 90-degree bends cut from pipe and mudded together weren't very popular with our customers; and we finally found a new machine that works fine for 4-, 6- and 8-in. bends; gets 75 pieces of 4-in. ¼ bends and 100 pieces of ⅛ bends in eight hours. Larger sizes scale down in proportion. We make good profit on these.

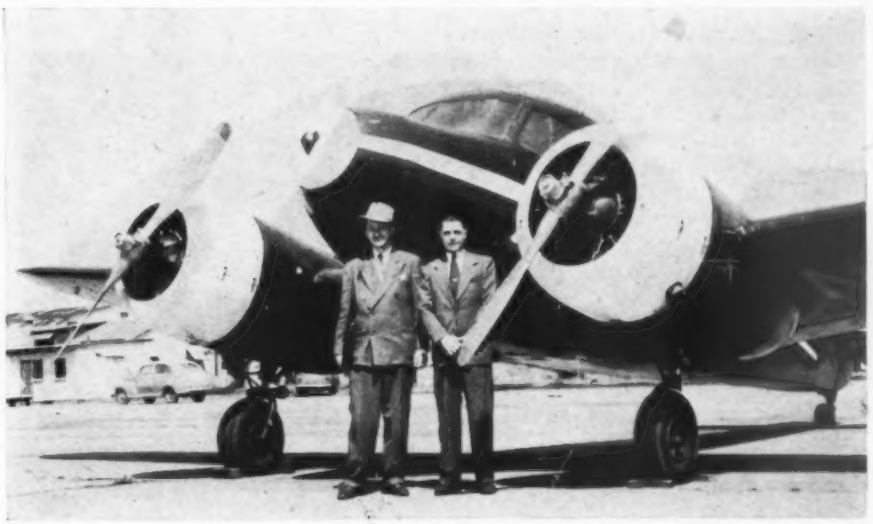
When we were trying to work out our mix on 45-degree and 90-degree bends and our Y and T stubs, we had a hard time holding our absorption rate down. When the man in the laboratory put 'em under hydrostatic pressure, they leaked bad. Finally we added a couple of shovels of plain bank sand per bag of cement. Actually it was just a good fine sandy soil. No more trouble; compression tests were o.k., too.

Then there was another thing that bothered us a lot. Our 45-degree and 90-degree bends kept having bad cases of "limber neck" and would fall down. Well, you know, my foreman Vinz tried setting the spigot end up against a perpendicular wall before it was stripped out of the jacket. It worked! Sort of burred the lower inside of the spigot end, but he soon learned that if it was placed perfectly, it wouldn't do that.

When the boys in the pipe section mudded Y's and T's in the fitting room, they used a trowel to apply the mud. One day some one lost the trowel. One fellow dug in with his hands and went after the job like a kid making mud pies. Results—first, two very sore hands; second, a lot more production. Now we use black treated canvas gloves for the job (bought at the corner grocery store, and often used around battery stations) and our hands. After the mud has set, an old paint brush and a little water will dress up the job. Vinz rigged up a couple of 2 by 6 boards into a bench, placing them on edge about hip high and about 24 in. apart to lay the stems for the Y's and T's on, so the "mudder" could get out more production with more ease.

Then he made a table for the mud; it had wheels so it could be rolled along. You'd be surprised how many of those fittings can be put side by side along side of a building and how fast one man can make 'em.

The "beginner" who will chat with us in this new department each month has been engaged in the concrete products business for the last six years. We believe that our readers will find in his homespun, practical suggestions many down-to-earth, usable ideas covering wide segments of the industry.



• The modern trend in customer service is indicated by this photograph of Roy Darden, president of Roy Darden Industries, Inc., Atlanta, Ga., and Pilot C. E. (Pete) Eberhardt (right), about to leave on a 1,000-mile business trip in the company's new 5-passenger twin-motor Cessna. The plane was purchased to enable Mr. Darden and his associates to provide speedy nationwide service to users of F. & A. Floor and Roof System equipment.

Marietta Concrete Jumps Silo Stave Output with New Plant at Baltimore

• Marietta Concrete Corporation's staff at Baltimore: C. Boyd Ross, vice-president of Marietta and manager of the Baltimore plant; J. Darwin Ross, assistant manager; Twila-Louese Ross, bookkeeper; Robert Wiedmeir, shipping clerk; and Michael Wills, plant superintendent.

another ON THE SPOT report

OVER a period of years there have been a number of reports in these pages on the operations of The Marietta Concrete Corporation of Marietta, O., the country's largest manufacturer of precast concrete

By WILLIAM M. AVERY

storage systems. Most recently (in September, 1947) we told our readers about an extensive revamping and expansion program which the company had carried out at its home plant in Marietta. One of the highlights of that report was the disclosure of the successful operation of a vibrating machine which produced concrete staves at the unheard-of rate of 6,000 in an 8-hr. shift.

The machine which accomplished this modern miracle was a custom-built Besser Vibrapac which was designed throughout for the production of staves. Equipment formerly used by the company turned out about 1,800 units per day, and required a 3-man operating crew, as compared with one man on the Besser machine. One immediate effect of this development at Marietta was to render virtually obsolete the facilities which the company then had in operation at other locations. A duplicate machine was ordered for the company's Baltimore plant, and work was begun on the design and construction of an entirely new layout which would bring both production and efficiency up to the high level of the home plant.

The new Baltimore plant began producing concrete masonry units in May, 1947, and two months later the stave section of the plant went into operation. In basic arrangement it is very similar to the plant at Marietta. For aggregate storage there are four 12-ft. I.D. concrete stave bins ranging from 55 to 70 ft. in height, and holding from 250 to 300 tons of material each. These are grouped around a 24-in. belt conveyor which is used for feeding either incoming material from an undertrack hopper, or reclaimed material from the bins, to the aggregate elevator. The elevator discharges into a swivel spout at the top of the plant through which materials flow to any one of the four storage bins, or to any compartment of the 4-compartment, 90-cu. yd. batching bins within the plant proper.

Bulk cement is handled and stored in very much the same fashion, except that a screw conveyor is used instead of a belt. There are two main cement storage bins with a combined capacity of about 2,500 bbls., and two tanks, holding 30 bbls. and 60 bbls., over the batcher. Both the bins and the small tanks are supplied from a single bucket elevator. All the conveyors, small bins and tanks, elevators and weigh batchers used in the plant were built by C. S. Johnson Co.

Both heavyweight and lightweight aggregate are used in the plant, the former consisting of washed sand and gravel, and the latter of foamed slag trucked from the Sparrows Point plant of Bethlehem Steel Co. In the past almost all staves were made with heavyweight aggregate,

• A general view of the new plant at Baltimore. All Marietta blocks are marked under the trade name "Maconco." The stack at the right is built of silo staves. It is 3 ft. in diameter (inside) and 80 ft. high.

but the company has recently started producing a new type of stave in which weight reduction and insulating properties are important. This is a 5-in. thick hollow stave (standard 10- by 30-in. face dimensions) in which the core spaces run horizontally in order to prevent air circulation in the walls of the completed structure. It is used for grain storage silos and similar applications in which there must be no condensation. The use of foamed slag aggregate brings the weight of this special unit down to 60 lbs., as compared with 90 lbs. when sand and gravel is used. The company's block production is divided about equally between heavyweight and lightweight units.

On the mixing platform within the plant there are three 50-cu. ft. Besser batch mixers. Two of these supply the stave machine, and the third feeds the Besser Super Vibrapac block machine. There is a fourth small mixer, located on the machine floor level, which is used in making precast door frames and other specials related to the concrete stave silo field. All aggregates, cement and water are weighed by three Johnson weigh batchers located on a separate platform above the mixing floor.

The main machine room of the plant measures 60 by 100 ft. The stave machine is located about in the center of the room, with the block machine off to the right in a skew position to give maximum clearance in the working areas. Access to the curing kilns is gained through an 18-ft. aisle which opens into the machine room. There are four kilns on each side of the aisle, which opens at the opposite end onto the storage yard.

The 10- by 30- by 2½-in. standard staves are delivered standing on edge with the 10-in. dimension vertical. Six staves are produced in each cycle of operation. They are delivered to the front of the machine on corrugated steel pallets which measure 27 by 32 in., and which can be handled in the same racks used for blocks. Only 8 pallets of staves, however, are loaded into a standard 20-pallet steel rack because of the greater weight of the staves. In all, 200 racks are required to serve the two machines. All the racks have been galvanized by the hot-dip process in an effort to prolong their useful life.

Once the staves and blocks are molded they are handled and cured in much the same manner. The same type of off-bearer is used on both machines, and the same lift-trucks handle the loaded racks. There are three power lift-trucks in the plant—a pneumatic-tire Towmotor fork truck used for handling racks and cubes, a solid-tire Clark used for handling racks, and a pneumatic-tire Clark as a spare and for occasional use in loading trucks.

Steam for curing and for heating the building is supplied by a 178-hp. oil-fired Pacific boiler which is housed in a separate building adjacent to the kilns. Live steam enters the kilns through 1-in. drilled pipes at ceiling level on each side, and there are also fin-type heaters for additional heat, if it is required.

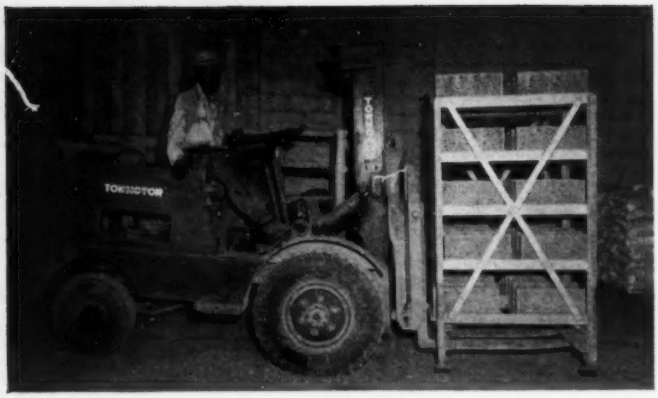
As soon as the kilns are loaded, the doors are closed, and the units are allowed to stand at room temperature for about 4 hours. After this initial setting period, steam is introduced, and the temperature is brought up to 165 or 170 deg. F. in a period of 3½ to 4 hours. This temperature is held overnight with the steam on. In the morning the kilns are opened, and the work of unloading begins. This cycle yields a test of 750 p.s.i. on foamed slag units in 24 hours.

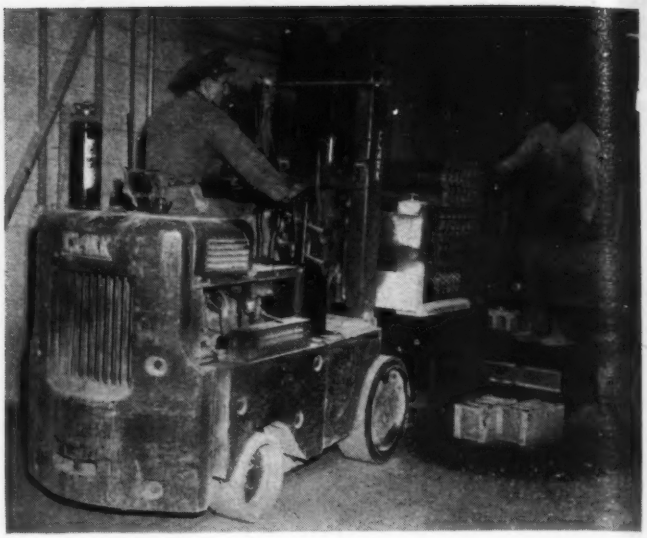
Outer walls of the kilns are 18 in. thick with a 2-in. dead air space in the center to reduce heat loss to the minimum. The roof is 6-in. poured concrete, and the rooms open at the aisle end only. Openings to the kilns

• Right: The stave machine delivers six 10- by 30- by 2½-in. staves in each cycle of operation. Concrete is supplied by two 50-cu. ft. mixers located above.

• Right: A view of the block machine on which about 5,000 equivalent 8-in. units are produced in an 8-hr. day.

• Right: Batching is done with these multi-beam scales, located on a platform above the mixers.





• One of the pneumatic-tire fork-lift trucks bearing a rack full of cured block.

• Right: Delivering a load of pallets to the magazine at the rear of the stave machine with a solid-tire lift truck.

are closed off during the curing process with aluminum doors which contain glass fibre insulation. The doors are hinged at the top, and they seal tightly against hose gaskets around the openings. The 8 kilns have a total capacity of 232 racks.

Staves are transported directly to the storage yard, where they are removed from the racks and stacked in piles for additional open-air curing. Most of the plant's block production is cubed before it is removed to the storage yard. The 60-unit cubes (4 deep by 3 wide) are put together in one corner of the machine room, and then transported to the storage yard. Due to the high strength of the units, no breakage has resulted from handling the cubes through the cores. Four-inch units are cubed on pallets.

About 650 blocks are produced in an hour on the Besser Vibrapac, and the stave machine turns out approximately 800 standard 10- by 30- by 2½-in. staves per hour, or 6,000 in an average 8-hr. day. The output of staves is equivalent to 8 or 10 silos per day. Although concrete stave silos are now used for a multitude of purposes other than for the storage of ensilage on farms, the farm market still accounts for a major part of the output of the Baltimore plant. Staves are shipped, primarily by truck, into Pennsylvania, New Jersey, Delaware, Virginia and West Virginia, and in rare instances as far as New York and Massachusetts to the north and Florida to the south. The company operates a few trucks of its own, but most shipments are handled by contract haulers. Marietta silos are always installed by the company's own experienced erection crews, who travel from job to job throughout the territory during the summer months.

Marietta's new facilities at Baltimore, which completely replace a plant built there in 1935, are located on a 7½-acre tract adjacent to U.S. Route 40, about 3½ miles east of the city limits. In addition to the buildings which house the main plant and the boiler and locker rooms, there is on the property a new 40- by 100-ft. foamed slag block structure designed for the storage of doors, roofs, glass, bagged cement, and other materials used in the construction of silos.

The 30 men employed in the operation work a single shift 6 days per week. C. Boyd Ross, manager of the Baltimore plant, is vice-president of The Marietta Concrete Corp. His son, J. Darwin Ross, is assistant manager, and Michael Wills is plant superintendent.

N. C. Legislature Receives Bill for Plant Inspection Fee

A bill to impose a $100 inspection fee on manufacturers of concrete and cinder blocks was introduced in the North Carolina Legislature on March 24 by Representative Harry Greene of Hoke.

The proposed legislation would provide an annual $100 inspection fee for each plant manufacturing concrete blocks, cinder blocks and other concrete masonry units in the state. It also would provide for an inspection plan for units shipped in from points outside North Carolina.

Under the measure, the state superintendent of weights and measures would inspect the manufacturing plants and select samples to be tested for load-bearing strength.

Barbecue Marks Opening Of New Concrete Block Plant

Officials of the Tifton Brick Company at Tifton, Ga., recently entertained leaders of the construction industries of south Georgia at a barbecue upon the occasion of the opening of their new block plant. After the festivities the guests were conducted through the plant, which was put in full production, with the Besser Super Vibrapac machine turning out concrete masonry units.

Heading the concern are T. A. Holmes, L. J. Smraker and H. E. Mason.

Texas Concrete Pipe Firm Capitalizes on Its Location

A strategic location on a Texas highway is paying-off for the Fort Worth Concrete Products Company, according to Ed Irvin, co-owner of the business. The plant was built on the Weather-ford Highway, in the path of traffic between western Texas and Fort Worth. Mr. Irvin states that cattle truckers, ranchers and farmers who would ordinarily return from the city with empty trucks, find it convenient to stop at the plant and load their vehicles with needed items such as sewer pipe and septic tanks.

Mr. Irvin explains that the firm's pipe is made in 3-ft. lengths (longer than conventional lengths) to reduce the cost of laying and lessen the number of joints for possible penetration by roots. Other products include fittings, drain tile, water boxes, stock troughs, and grease traps.

Two-Day Concrete School Held At N. U. Technology Institute

Northwestern University's Technology Institute was the scene of a two-day session sponsored by the engineering school, for studies on quality concrete. The "school" was in session on March 8 and 9, under the direction of Dean Ovid W. Eshbach of the institute.

Men interested in construction problems were invited to receive the latest available information on structural uses of concrete and to see demonstrations by technicians trained by the Portland Cement Association. Demonstrations were conducted by H. F. Sommerschield, structural field representative, and E. A. Kramer, local P.C.A. field engineer.

The course emphasized the latest developments in selecting materials, designing concrete mixes, placing and curing, design and related matters. A question-and-answer period followed each two-hour lecture session.

An On-the-Scene Report Of The Concrete Roof Tile Industry in Great Britain

• E. R. Wallace, plant manager (left) and H. A. Wilkinson, director and chief engineer of Redland Tiles, Ltd. Mr. Wilkinson designs all the equipment.

another P and Q exclusive

IN EUROPE in former times the most popular materials for roof covering were slate, used in northern Europe, and clay tiles, popular since Roman times in southern Europe. Comparatively

By ALFRED A. RYNER

recently slate has declined in use because of its high cost and the lack of the skilled labor necessary for quarrying and splitting it. In Britain the use of plain rectangular clay tiles became almost universal.

Shortly after the close of World War I the Redhill Tile Company commenced the manufacture of concrete roof tiles in quantities. Others had attempted this previously with varying success, but from this time onward the concrete roof tile industry began to expand. Several other firms entered the field, and by 1930 the industry was well established. With the introduction of power-driven machinery output increased rapidly and competition became intense—both against competitive materials, particularly clay tiles, and also among individual concrete tile manufacturers.

Concrete tile proved to be inexpensive, weather-resistant, durable and easy to lay. Backed by energetic marketing methods, it began to make heavy inroads upon the clay tile market. In 1939, the output of concrete tiles was almost equal to that of clay tiles.

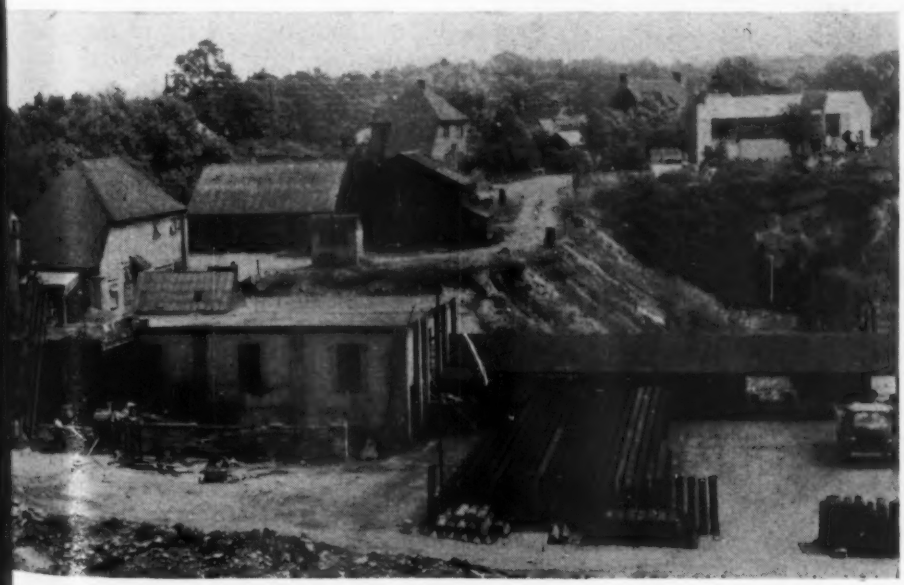
With the limited resumption of building after World War II, concrete tile continued to supply about half the market requirements, but when competition returned early in 1948, concrete tile went ahead and for the first time exceeded the output of clay tiles. Production figures for February, 1948, show that 84,000 squares of concrete tiles were produced, as against 72,000 squares of clay tiles. There is every indication that concrete tile will continue to forge ahead, with the increasing use of automatic plants and the growing popularity of interlocking tiles—particularly as the clay tile industry is now handicapped by high fuel and labor costs.

In style and color, concrete roof tiles continue to imitate clay tiles. In fact, when laid they are indistinguishable in appearance. The two most popular styles are the plain or "Broseley" pattern, and the interlocking. Plain tiles are made in accordance with British Standard Specification No. 473 and must measure 10½ inches by 6½ inches, and not less than 7/16 inch thick. They must be cambered about a quarter inch from top to bottom and can also be cross-cambered. They must have nibs at the top for suspension and also nail holes. The specification requires them to be colored throughout.

Interlocking tiles (British Standard Specification No. 550) measure 15 inches by 9 inches and ⅜ to ½ inch thick, with an overlap at the interlocking portion of not less than one inch. They are provided with two nibs and one nail hole.

Tiles are made in various colors—red, green, blue, yellow—but various shades of red continue to enjoy the greatest popularity. The coloring of concrete roof tiles is one of the most important parts of the process of manufacture. It is generally carried out in three stages. First a suitable oxide color is mixed

• Right: A general view of the plant and the stacking yard, showing the sand washer and the elevator.
• Below: A general view of the plant and yard No. 1 of Redland's Runfold plant.



Photograph by Gale & Polden, Ltd., Aldershot, Eng.

• The continuous mixer, with the operator adjusting the flow of water onto the rotating table. Three hoppers feed cement, sand and color from bins on the floor above. The agitator with its motor and the controls for mix proportions are on the other side of the machine.

Photograph by Gale & Polden, Ltd., Aldershot, Eng.

• The automatic tile machine and racks. The flying cut-off is at the right of the hopper; farther to the right is the sifter for topping sand.

with the cement used for making the tiles, to give them a "body color". Second, immediately after molding, the tiles are dusted over on the top surface with a "topping" of colored cement or colored sand and cement mixture, graded according to the texture required. The topping is often darker than the body color and may contain a proportion of black pigment. It can be sprayed with water, smoothed with brushes and so forth, to produce various styles of finish. Finally, after 24 hours, when the tiles have taken their initial set, they are dipped in a wash containing coloring matter and also certain chemical materials which help to fix the colors. Dipping insures uniformity of color over the whole tile—particularly the edges, which may not have been covered by the topping.

Various kinds of pallets are used in automatic tile manufacture, the cast iron pallet probably being the most popular. However, the present tendency is to change over to die-cast aluminum pallets. Pallets must be suitably shaped to form the under side of the tile; the top surface is formed by suitably profiled rollers and trowel plates in the moulding machinery, which also serve to compress the concrete to the required density.

The Redhill Tile Company started production in 1919. At first both plain and interlocking tiles were made by hand. In 1923 the first power-driven machine for making interlocking tiles was used. The company's output of interlocking tiles increased steadily until 1939 and the outbreak of World War II. The owners' success was due to the development of the power-driven machine for making interlocking tiles, and to their great faith in the future of this type of tile. The company started subsidiary plants at Leicester in 1936 and at Belfast in Northern Ireland in 1937.

In 1945 a new company was incorporated as Redland Tiles Limited, to take over the interests of the original organization and of a number of associated companies. At the same time an engineering company known as Carter Wilkinson Limited was formed to manufacture tile-making machinery and other equipment to the designs of H. A. Wilkinson, who is the chief engineer of the whole group. This plant, which is under the direct supervision of G. H. Carter, has its own iron foundry and machine shops and also equipment for die-casting aluminum pallets and other small parts required in large numbers.

Today Redland Tiles Ltd. controls no less than seven tile factories in various parts of the country, and is one of the largest firms in the industry. Both plain and interlocking tiles are produced on various types of power-driven machines. The conventional machines are of the flat type and are all similar in principle. The pallets are fed through the machine by a reciprocating mechanism. Starting from the pallet magazine, they pass under the hopper in which the concrete is distributed by a suitably profiled roller and a trowel plate. The pallets push one another through the machine in a continuous stream, but the tiles are divided one from the other by a knife which comes down during the period when the pallets are stationary. The same mechanism also pierces the nail holes. Next the tiles pass under a vibrating sifter which spreads the

topping on them. At the end of the machine the pallets are picked up by an off-bearing conveyor which travels continuously, thus separating them one from the other. From this conveyor they are transferred by hand to racks. The racks can be mounted on wheels or can be transferred by means of lift-trucks to steam curing rooms. After 24 hours of curing the tiles are depalleted, dipped and transferred to the stacking yard for final maturing.

The flat machines are fed by ordinary batch mixers of the pan type, the mixers being filled by means of skip hoists. Machines of this type can produce around 2,250 interlocking tiles or 6,000 plain tiles per hour. The plain tiles, being smaller, are made two on a pallet. The operation of these flat machines still involves a good deal of hand work in loading pallets into the machines, depalleting, dipping and so forth, and it was felt that it should be possible to make considerable improvements in the production process.

The first developments in this direction were made at the Company's plant in the picturesque Surrey village of Runfold. The Runfold Sand and Tile Company started making plain tiles with a flat machine in 1930, but about 15 years ago an entirely new plant, designed by Mr. Wilkinson, was installed. This is a fully automatic plant incorporating a continuous rotary-type machine and automatic racking of the pallets. The machine is fed by a continuous rotary table mixer. The rated output is 3,000 plain tiles per hour.

A visit was recently paid to the Runfold plant in the company of Mr. Wilkinson, and we were shown around by E. S. Wallace, the plant manager. Mr. Wallace has a total staff of sixteen. This team not only produces the tiles but also excavates the sand, loads the finished tiles, carries out yarding, office work and so forth. Its average production is 6,000 tiles per man per week, from raw materials to finished products loaded onto transport. The plant has now been operating successfully for nearly 15 years (with the exception of the war years), with the greatest success. It forms the prototype of a much larger fully automatic installation for producing interlocking tiles which the company is now constructing at its Moorhouse works.

The compact building at Runfold is situated in a sand pit. It has three floor levels and is so arranged that trucks can approach it on two different levels. Cement is delivered in bags to the top floor and from this point is fed down to the mixer and thence to the tile machine by gravity. Pigments are handled in the same way.

Sand is excavated in the pit in which the plant is located and is trucked about 200 yards to a point outside the building. Here it is shoveled into a small counter-flow washer from which it is raised by a belt-type bucket elevator to a bin on the same level as the cement and color stores. The working face of the sand pit is about 30 feet high and consists of almost pure white sand with occasional darker veins which are separated for use, after burning, as topping material. The sand is easily excavated by hand, the quantity required for a daily output of 20,000 tiles being about 35 tons. The sand could be excavated to a much greater depth, but about 30 feet is a convenient

Photograph by Gale & Polden, Ltd., Aldershot, Eng.

• A closeup of the pallet racks. The pallets arrive from the machine on the cable conveyor. The pneumatic ram pushes them into the rack; then raises the rack after six strokes.

Photograph by Gale & Polden, Ltd., Aldershot, Eng.

• After depalleting, the tiles are dipped and then stacked in the open. In the background is the portable conveyor which carries the tiles to the stackers.

depth, at which level no water is encountered.

An outstanding feature of the Runfold plant is the automatic continuous mixer of the company's own design. This mixer has been operating successfully since the plant was built. A much larger mixer now under construction at Moorhouse was patterned after it. A similar mixer is also used at Carter Wilkinson's foundry for mixing the molding sand. The mixer is arranged for automatic proportioning of the materials by volume. It has an output of 5 t. p. h., and with consistent raw materials will work with a high degree of precision. It consists of a rotating steel table about 8 feet in diameter, driven by bevel gearing from a motor located underneath. The mixing is done on the surface of this table and the materials are fed directly onto it from the three overhead bins containing cement, sand and color respectively. The outlets of these bins are situated only about one inch above the surface of the table, the exact clearance being adjustable by means of three separate control knobs. In this way, as the table rotates, the three materials are automatically proportioned by volume and accurately and continuously controlled. Water flows directly onto the table and is likewise controlled by the operator. Several stationary blades direct the movement of material on the table; and a high-speed agitator, driven by a separate motor, performs the actual mixing operation. The speed and blade form of the agitators can be varied according to requirements. The materials move gradually outwards on the table and eventually are diverted over the edge by another fixed blade; they fall into a hopper which feeds the tile machine on the floor below. The amount of material actually on the table at any time is quite small. The mix generally used for tiles is one part of cement to three of sand, a suitable proportion of color, and sufficient water to give a mix of stiff consistency. High-early-strength cement is used at Runfold, as there is no provision for steam curing.

From the mixer the material falls into the hopper of the tile machine, where a rotary agitator distributes it and a roller compresses it. The pallets, carried from the pallet magazine on the periphery of a large steel drum, pass under the hopper continuously. Only plain tiles are made at Runfold, and two tiles are made at a time. The roller in the hopper spreads out the material onto the pallets in a continuous ribbon two tiles wide. A rotary knife divides the ribbon into two single tile widths, or into tile-and-a-half and half-tile. While the drum continues to carry the pallets forward, a flying cut-off device divides one pair of tiles from the next and at the same time pierces the nail holes. The pallets then pass under the sifter, which spreads topping sand on them. Two or more different colors—black and red, for instance—can be used simultaneously in parallel bands, producing a particolored tile having an attractive mellow appearance.

From the rotating drum the pallets are picked up by a twin-cable conveyor moving at a greater speed so as to separate them from one another, and carried to the automatic racking mechanism. The racks are of the suspended type, six pallets (12 tiles) wide and fifty tiers high. They are suspended in pairs by cables passing over pulleys. As the racks are always full, they are evenly balanced and easily moved up and down, one rack rising as the other falls.

The racks are loaded by a pneumatic ram which can be moved to a position opposite the particular rack to be loaded. The pallet travels on the conveyor until it reaches the ram, when it is automatically pushed off the conveyor onto the rack. Simultaneously a pallet which has been in the rack for 24 hours is pushed off the rack on the opposite side and falls onto a similar conveyor traveling in the opposite direction. After every six strokes a separate vertical ram is automatically actuated, raising the rack one tier. When all fifty tiers have been filled the ram is moved by the operator to the next rack. The ram machanism is mounted on rails and moves on small wheels, so that very little time is required to move it to a fresh position. The operator of the racking mechanism is boss of the tile-making gang; and near each rack he has a pair of push buttons by means of which he can start and stop the tile machine and the conveyors without moving from his working position. The other operatiers have push buttons for stopping the equipment in case of emergency, but no button for starting.

As the pallets fall out of the rack on the delivery side the slight shock is sufficient to loosen the tiles. At the end of the conveyor an operator picks up the two tiles from the pallet and transfers them to a third conveyor on which they travel out of the building into the stacking yard. Meanwhile the pallets continue on the off-loading conveyor to the automatic pallet oiler, from which they are delivered (on edge, so that excess oil can drain off) to the pallet magazine of the tile machine. It will be seen that the pallets always travel in a closed circuit and are not touched by hand at any time.

Meanwhile the tiles are carried into the yard by the delivery conveyor, which is under cover. The stacks of finished tiles in the yard radiate from this covered way and a portable conveyor is set up alongside the stack which is being built up. As the tiles arrive on the delivery conveyor they are packed into a cradle which is then dipped into the color bath. After draining they are placed on the portable yard conveyor and carried to the stacking point. An improved type of portable conveyor has recently been developed by the company which is built in short standardized sections light enough to be handled by one man and capable of being quickly built up to any required length. It will be noted that all the conveyors are of the twin cable type, which is in fact used throughout the industry. Its great advantages are smooth operation and reliability, together with its ability to handle green tiles with the minimum of breakages.

One other activity which has not been described is the preparation of the topping sand. Two pieces of equipment are used for this. One is a sand burner, which is a small oil-fired rotary kiln in which specially selected grades of sand are burned, producing a natural red color and insuring perfect dryness. These sand burners are built in the Carter Wilkinson plant and are sold to many firms in the industry. The second piece of equipment is a ball mill which is used for mixing pigments with cement.

Output of the Runfold plant runs very consistently at about 100,000 tiles per week, and costs are low enough to allow the tiles to be delivered by road transport at competitive prices to destinations up to 200 miles distant.

The automatic machine does not, of course, make specials. These are made by hand, one man being able to produce sufficient for all requirements.

At the company's Moorhouse works, also in the county of Surrey and about 30 miles east of Runfold, there are two flat type machines in operation; one produces plain tiles and the other interlocking

(*Continued on page* 216)

$13,500,000 Concrete Pipe Job Will Reclaim California Desert Wasteland

another ON THE SPOT report

CONCRETE pipe is currently playing another important role in California, where it is destined to conduct Colorado River water to the heretofore barren desert wastes of the Coachella Valley.

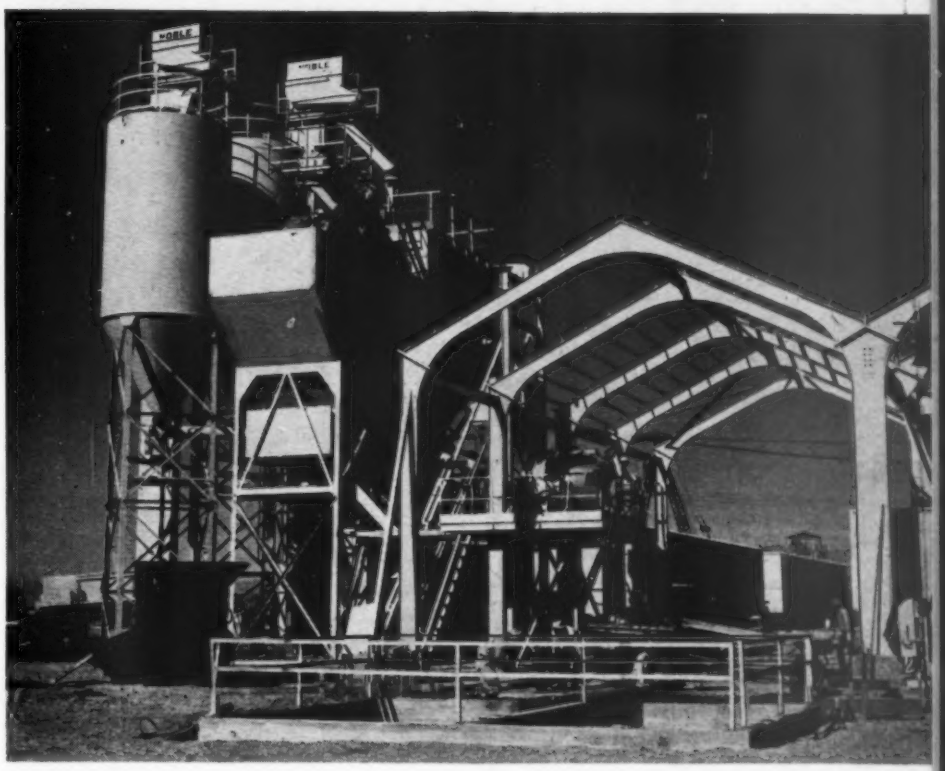
This $13,500,000 Bureau of Reclamation distribution project, using

By HARRY F. UTLEY

concrete pipe exclusively, will, by the end of 1949 or early in 1950, place approximately 60,000 acres of virgin soil in production for the first time. Dates, grapes, winter vegetables and grapefruit will grow in abundance where now only cactus, mesquite and greasewood struggle for existence.

Source of the water is the concrete-lined All-American Canal which follows the U. S.-Mexican border from Imperial Dam in the Colorado River above Yuma, Ariz. East of Holtville, Calif., the canal branches, one channel (the Coachella Valley Extension) running northward along the east shore of the Salton Sea to the vicinity of Indio. The other branch extends westward to serve the Imperial Valley and terminates near El Centro.

The concrete pipe-lines will form a network of laterals and sub-laterals to distribute the life-giving water from the Coachella branch of the canal. The distribution project is divided into nine separate units, five of which are already under construction. Of the remaining four units, bids were opened on one in January and is probably under contract by now. The other three units are scheduled for award no later than June 30, 1949.



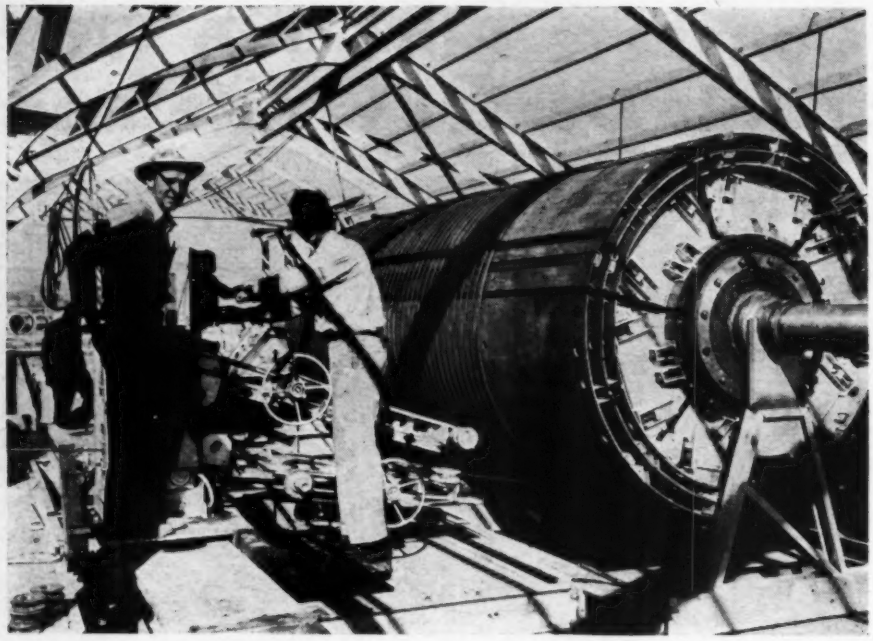
• The American Pipe & Construction Company's plant near Mecca, Calif., showing the two batch plants, the spinning bed for centrifugally-made pipe in the foreground, and curing boxes in the background.

Unit No. 1, awarded to the American Pipe & Construction Co. on its bid of $1,595,462, is a high-pressure lateral of 78- and 84-in. diameter lock-joint reinforced-concrete pipe involving approximately 37,000 lineal feet. Unit No. 5, also under contract to American Pipe & Construction Co., involves $1,489,-477 and consists of centrifugally-spun (Hume process) sections in diameters ranging from 12 to 72 in. American was also low bidder on Unit No. 6 with a figure of $2,049,-922.

A modern plant for the casting and spinning of the pipe has been erected by the American Pipe & Construction Co. near Mecca, Calif.

Units No. 2, 3, and 4, totaling $2,204,052, are under contract to R. V. Lloyd & Co. of Russellville,

• Left: Pouring pipe forms from a 2-cu. yd. bucket, handled by a locomotive crane. Note the externally-mounted air-powered vibrator on the form jacket.
• Right: The locomotive crane lifting a section of 78-in.-diameter pipe from the base ring.



• A closeup of the cage-winding machine for fabricating reinforcing. The rods are automatically spot-welded.

Ark. The Lloyd concern is not producing pipe, however, but is purchasing it on specification from independent producers, chiefly the Concrete Conduit Co. of Colton, Calif. This involves for the most part small-diameter irrigation pipe which is laid by the Lloyd field organization for final distribution of the water to the thousand or more 40-acre tracts into which the area to be reclaimed is divided.

The American Pipe plant near Mecca is equipped with two Noble batching-and-mixing plants served by bulk-cement silos. Aggregates and cement are trucked in. One plant supplies concrete for poured cylinder pipe; the other the spun pressure pipe. Operations and equipment are practically identical with those used by the company at El Cajon, Calif., where it produced concrete cylinder pipe for the San Diego Aqueduct. (See Pit & Quarry, *March*, 1947, *pp.* 146-150.) An American Hoist 25-ton diesel locomotive crane handles a 2-cu. yd. bucket which fills the huge steel forms laid out on each side of the crane track. Steel curing boxes are placed over the sections by the crane after pouring, and the steam is turned on. Externally-hung Viber air-powered vibrators are used to compact the concrete. This method of vibration was developed by American engineers a few years ago and has proved highly successful on the San Diego Aqueduct, Los Angeles Hyperion Outfall Sewer, and other jobs.

The centrifugally-spun pipe setup is a typical Hume process installation, the spinning machines being equipped with mechanical feeders. Concrete masonry tunnels have been constructed to steam-cure the pipe. Reinforcing cages and steel cylinders are cut, formed and welded at the plant site.

The take-off on the canal is 20 ft. above sea level at a point northeast of Mecca from which the Unit No. 1 high-pressure lateral, 7 and 6½ ft. in diameter, runs for a distance of 7 miles to feed the final distribution network and terminates at a point about 80 ft. below sea level. Trenching and pipe-laying are done with the same machine, a Lima crawler-mounted crane with a 50-ft. boom. The trench is usually dug during the night, using a 3-cu. yd. bucket. Average depth of the trench is 12 ft. The pipe is transported from the Mecca plant to the trench line by 20-ton tractor-trailers of the American Pipe & Construction Co. fleet. These are Sterling units powered by Cummins diesel engines. The 16-ft. sections of 84-in. pipe weigh over 17 tons, or more than a ton per foot of pipe length! As a length of pipe is placed in position by the crane, it is sealed with a special continuous rubber gasket and grouted both inside and out at the joint.

For the American Pipe & Construction Co., W. A. Denton is general superintendent of the Mecca pipe plant. Chas. McCarty is foreman of the poured-pipe division, while Cliff Davis serves in a similar capacity at the Hume spinners. Thomas R. Wilcox is installation superintendent.

C. S. Hale is chief project engineer for the Bureau of Reclamation.

San Jose Operator Builds $100,000 Concrete Mix Plant

A new $100,000 concrete batching plant was recently completed at the plant of the C. P. Albanese Concrete Supply Company in San Jose, Calif., the first of its kind in this area. The new structure includes an 80-ft. tower, topped by the housing for motors which power the conveyors. Cement is stored in the adjacent silo.

Mr. Albanese entered the concrete industry in 1938 on what he describes as "a piece of a shoestring," a working capital of $65. In recent years he has furnished concrete for many commercial buildings and school construction projects involving concrete floors and roofs.

Officials of the Halliburton Oil Well Cementing Company, Dallas, Texas, declared a quarterly dividend of 37½ cents per share, payable on March 30 to stockholders of record March 20. Net income for 1948 was reported to have been $6,597,443, as compared with $4,801,687 in 1947.

• One of the pipe sections is here being skidded off the special truck-trailer, one unit of the American Pipe & Construction Company's fleet.

Revamp Stearns Plant in Interest Of Improved Service to Customers

another ON THE SPOT report

IN these pages we report frequently on the measures taken by producers of concrete masonry units to achieve higher yield per man-day, better overall efficiency in their plant operations, and improved service for their customers. Although their efforts along similar lines are less extensively publicized, the manufacturers of machinery and equipment for the industry are beset by very much the same problems, and they strive with equal zeal to solve them.

This fact was brought to our attention with considerable impact several weeks ago when we spent a day as the guest of the Stearns Manufacturing Company at the home office and plant in Adrian, Mich. The company has recently completed a streamlining program undertaken for the two-fold purpose of increasing productive efficiency and improving customer service. The program affected such diverse elements as machine shop facilities, inspection, production and quality control, routing, parts storage, lighting, and the handling of incoming and outgoing shipments.

Machine tools which were formerly located in two separate buildings have been consolidated in a single shop, and floor space for this important adjunct of the plant has been increased about 80 percent.

• A view in the Stearns revamped machine shop. Modern lighting, increased floor space and new machine tools have stepped up production considerably, making the company virtually independent of outside suppliers.

Several new modern machine tools, including grinders, were installed to step up production and to make the plant virtually independent of outside suppliers. Modern fluorescent lighting and color treatment of machines have also been adopted with good effect.

Spread out in a number of separate buildings, the plant had suffered to some extent from routing bottlenecks which had accumulated over a period of years. Formerly there were two receiving points and two shipping points located on opposite sides of the plants. These have now been consolidatd. Storage bins, previously scattered throughout the plant, are now grouped together at a single location, and an accurate running inventory is kept to show quantities on hand at all times. This change alone has made possible a considerable reduction in the number of assembled machines carried in stock; it has also speeded up the shipment of replacement parts to customers.

The factory office is the heart of a new routing system adopted to expedite the handling of all orders. Colored tags now identify all rush orders and assure their rapid progress through the plant. Parts no longer shuttle back and forth between buildings, and there is consequently less handling involved. All parts now pass through an inspection room just ahead of the stock room.

All gray iron castings used in Stearns equipment are made by the

• Key officials of Stearns Manufacturing Company, left to right: Arthur Gage, superintendent; F. M. Cook, vice-president and sales manager; W. G. Schutt, vice-president, production and engineering; D. S. Hall, secretary and comptroller; Myron Hultmark, president; M. F. Ledford, assistant sales manager; LeRoy Nelson, Concrete Products Supply Co., Minneapolis, Minn.; A. H. Moore, service manager; and J. L. Tuttle, purchasing agent.

Bassett Foundry Company, a wholly-owned subsidiary of Stearns located next door to the main plant. This is one of the two foundries in Michigan which are licensed to manufacture Ni-Hard, a wear-resistant alloy which performs well in concrete block machinery. Other heat-treatable gray iron alloys are produced for parts subject to severe wear, including an extremely tough material which makes it possible to cast very thin, fully modular pallets having most of the properties of steel pallets. The foundry has recently been equipped with a small laboratory so that the closest possible control can be maintained.

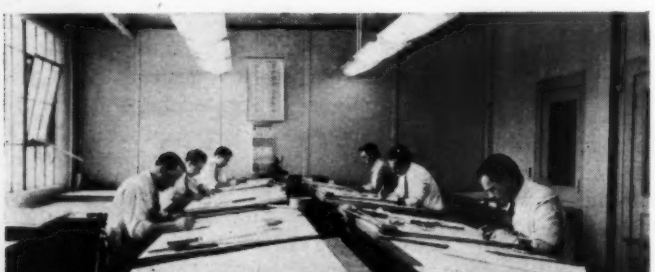
The Stearns line of concrete block machinery is probably unique in that it serves plants of all sizes. The largest machine, the "15", is a fully-automatic plain-pallet design. It produces three 8-in. units in each cycle of operation, with an adjustable production speed of 4 to 6 cycles per minute. Equipped with a pallet return and a magnetic offbearer, the "15" can be operated at top speed by one man.

The No. 9 Joltcrete, a cored-pallet machine, produces three 8-in. units in each cycle of operation, at a rate of 9 to 11 per minute. A smaller version of the same machine produces two equivalents per cycle at a speed of 6 to 8 units per minute. The Clipper Stripper is a tamp-type machine produced in four models, ranging from the all-power Model A, with a rated capacity of 250 units per hour, to the manually-operated Model E, with a capacity of 100 to 150 units per hour. The Model E is designed to permit the addition of power feeder, power strike-off and power stripping, so that it can be built into the all-power Model A as the owner's business develops.

Other machines in the Stearns line include batch mixers ranging from 12 to 50 cu. ft., skip loaders, manual- and power-operated turn tables to facilitate rack loading, power offbearing equipment, and the portable Yardhoist. The company also makes equipment for the production of Sinterlite lightweight aggregate.

Throughout the Stearns organization every effort is made to integrate production with field experience, not only on a long-range basis, but from week to week. All practical suggestions for improvements on any of the machines are rated as to their importance at the time they are received, and the most important ones are routed to the drafting room immediately. Every man in the organization is encouraged to suggest improvements, and the company's field men are constantly on the lookout for important developments in the plants which operate Stearns equipment.

With the recent changes made in the plant at Adrian, the management of Stearns believes that the company is now in the best possible position to serve its customers. It is felt that better rounded and larger parts inventories will help prevent long shut-down delays in block plants, and that continued close integration between field experience and machine design will assure steady improvements in the entire line of Stearns equipment.



• All practical suggestions for the improvement of Stearns machines are promptly referred to the engineering department. Left to right: Everett Bailey, Harry Neal, Paul Valentine, Lyman Cory, Taylor Hershman and Victor Shadbolt, chief draftsman.

• A portion of the stock room, where parts for all machines are stored after they have passed a rigid inspection. Only a few complete machines are carried in stock, since they can be assembled quickly from parts inventory.

On-the-Scene Report

(*From page* 212)

tiles. At these works the new fully automatic plant to produce 6,000 interlocking tiles per hour, is under construction. All the mechanical equipment is being built in the Carter Wilkinson shops. The design of this plant is based upon the experience gained at Runfold. It incorporates the latest type of center-feed continuous rotary table mixer capable of handling up to 20 tons of material per hour, together with a new rotary tile machine of exceptional size. An improved automatic racking system is being constructed with provision for steam curing. Another outstanding feature will be the continuous automatic depalleting of the tiles after curing. All raw materials will be mechanically handled.

The new machine is expected to be the world's fastest interlocking concrete tile machine. The whole plant is planned to start production in 1949. The directors of Redland Tiles Ltd. are confident that it will make a substantial contribution to the solution of Britain's housing problem by producing tiles of the highest quality at the lowest possible cost. Once its success is established they look forward to installing similar plants in all parts of the world. It is hoped to give a full description of this new plant in a future number of this magazine.

California Associated Concrete Pipe Manufacturers Convene

By HARRY F. UTLEY

another ON THE SPOT report

MORE than 50 concrete-pipe manufacturers and a large number of guests were registered for the annual meeting of the California Associated Concrete Pipe Manufacturers, held on February 17 and 18 at Fresno, Calif.

Choice of officers for 1949 resulted in the re-election of H. W. Chutter (Jourdan Concrete Pipe Company, Fresno) as president; Fred N. Linn (United Concrete Pipe Corporation, Merced) as vice-president; and Hugh Pollard (Pollard Bros., Ltd., Fresno) as secretary-treasurer. Besides President Chutter, the following were chosen directors for 3-year terms: A. M. Herman of the Concrete Conduit Company, Colton; W. M. Hurst, Hurst Concrete Products Company, Santa Barbara; and H. M. Tellyer, Tellyer Concrete Pipe Company, Albuquerque, N. M.

Considerable discussion was held on the proposed revision of the specifications for concrete drain tile, A.S.T.M. C4-24 R. J. Reynolds, superintendent of the Imperial Irrigation District which embraces ever 600,000 acres, reported on the extensive use of clay and concrete drain tile in that district. Several hundred miles of drain tile have been used, which was at the start largely clay tile of 4-, 6-, and 8-in. diameters. In the last two years about 750 miles of clay and concrete drain tile have been installed to remove the accumulation of salts. Mr. Reynolds described in some detail the installation methods, explaining that the tile were bedded on about 2-in. of gravel with the gravel up to the top of the pipe and tar paper over the upper segment of the joints. Because of the salts in the soil, the concrete tile is being made with Type II cement.

Butt-end joints are being generally used; and Mr. Reynolds stated that, in some cases, the ends of concrete tile were rather rough, causing too much clearance at the joints. A suggestion as to use of tongue-and-groove joints caused Mr. Reynolds to comment that these may seal off, and that where butt-end joints were made and installed properly, they had proven entirely satisfactory. The pipe must be smooth for velocity because of the flat grades, and of good quality concrete of low absorption.

The irrigation-pipe research program being undertaken by Washington State College was reported upon in considerable detail. The investigation is being conducted to determine the causes, effect and possible remedies for the reduction in flow capacity from air entrainment and shock wave generation in concrete irrigation pipe. Considerable progress has been made in the field investigation in the Yakima Valley, and laboratory tests are now being made on various sizes of plastic tubing to simulate field conditions. Breakage of concrete irrigation pipe has been attributed to shock waves (water hammer) which produces excessive dynamo pressure. It is believed that these shock waves are generated by air action that occurs when a large volume of air escapes from a vent.

Analysis of observations and measurements on reduced flow lines indicate that pocketed air is the main cause of reduced flow. Although most lines that were reported to have reduced flow were on an even mean grade, it was observed that the variation of grade between individual joints of pipe was appreciable. This variation of grade between joints is believed to be enough to allow air to be pocketed at the summits where grade changes occur.

Laboratory studies on all phases of these problems are currently being carried out or are planned for the future.

Interesting drying test results on concrete pipe were revealed in reports of J. J. Waddell, testing engineer for the Bureau of Reclamation at Friant, and T. E. Stanton, materials engineer with the California Division of Highways.

The drying temperatures used by the Bureau were 130, 150, 180 and 212 deg. F.; the temperatures employed by the highway departments were 120, 150, 180 and 212 deg. F. Pipe for the tests came from several plants using different aggregates and manufacturing procedures, so the comparisons presented were not wholly representative. However, with few exceptions, all tests showed the absorption less when lower drying temperatures were used, although a longer drying time is required as the drying temperature is reduced. The tests further showed considerable variance in specimens from the same pipe sections, indicating that aggregates, mixing, compaction and curing, individually or collectively, affect the test results.

Surprisingly low coefficients of friction have developed in the 72-mile San Diego Aqueduct, an all-concrete pipe line now supplying water to the city of San Diego. This was revealed in a discussion of the performance of the recently-completed pipe line, with particular reference to a tabulation of hydraulic tests, by Fred C. Scobey, senior irrigation engineer of the U. S. Dept. of Agriculture.

Santa Barbara was selected as the place for the fall meeting of the organization. The gathering will be held some time in October.

One of the highlights of the gathering was a dinner dance in the ballroom of the Hotel Fresno, following the meeting proper. Attendance exceeded 100. The meeting was honored by the presence of Gilbert D. Williamson, the only active member of the original 1919 five-man board of directors of the association. Mr. Williamson was presented with a suitably-engraved electric desk clock to commemorate the event.

Hardwich Products Plant Being Built at Somerset, Ky.

At Somerset, Ky., the Hardwick Block and Tile Company has begun construction of a concrete products plant on a site adjoining its present facilities.

The firm intends to produce all sizes of concrete masonry units used in the construction industry; concrete septic tanks and ornamental products will also be made. Output is expected to be 8,000 units per day.

A Muliplex automatic concrete block machine will be among the pieces of equipment installed in the new plant. This machine is designed to turn out block testing 1,600 p.s.i.

Harlan Abbott Brown, associated with the Buffalo office of the Lehigh Portland Cement Company for more than 20 years, died at his home in Orchard Park, N. Y., on March 10 after an extended illness. He was well known to most of the leading road and construction contractors in New York state, since his duties carried him throughout the state, selling cement in major quantities to contractors and dealers.

A.C.P.A. Goes South for 41st Convention

MEMBERS and guests of the American Concrete Pipe Association assembled in the John Marshall Hotel at Richmond, Virginia, on March 10, 11, 12, and 13 for the association's 41st annual convention. In addition to a full panel of speakers who discussed business, technical, and operating problems pertinent to the concrete pipe industry, the conventioneers had plenty of opportunity to enjoy a generous dash of Southern hospitality.

Among the entertainment activities programmed were an outdoor old-fashioned shad bake sponsored by the Virginia and North Carolina Manufacturers, dinner and dancing at the famed Virginia Country Club as guests of the Manufacturers of Welded Wire Fabric, and an all-day trip to historic Williamsburg, Va.

Business sessions included speeches by a number of well-known men, among whom were General Robert L. Eichelberger, U.S. Army, retired; Colonel Dunn, assistant commandant of the Engineering School at Ft. Belvoir; Dr. Lorenz G. Straub director, St. Anthony Falls Hydraulic Laboratory, University of Minnesota; E. F. Kelley, chief, division of physical research; W. J. Schlick and M. G. Spangler, both research professors of civil engineering from Iowa State College. Some of their talks are abstracted in the report below.

By JOHN R. DUBLE

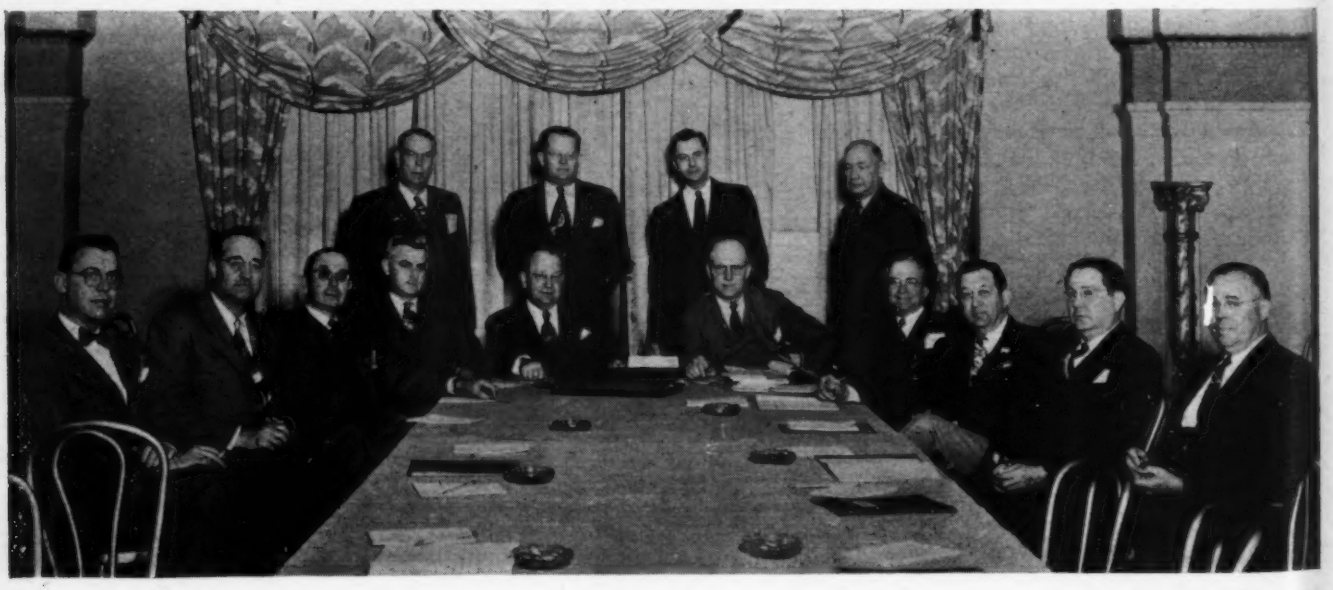
New officers elected for 1949 include the following: J. A. Dunn, Humpe Pipe of New England, president (re-elected); D. A. Dunkle, American Pipe & Construction Co., first vice-president; Earl H. Eby, Elk River Concrete Products Co., of Montana, second vice-president; P. R. Hirsh, Lock Joint Pipe Co., Montana, third vice-president; G. B. Denham, Faulkner Concrete Pipe Co., secretary (re-elected); and C. H. Bullen, Mid-West Concrete Pipe Co., treasurer (re-elected). Howard Peckworth will continue to serve as managing director of the association.

• J. A. Dunn, who was re-elected president of the American Concrete Pipe Association at the 41st convention.

Lewis G. Thomas, Thomas Concrete Pipe Co., Oklahoma City, Okla., presented the first paper, which concerned density tests based on concrete cylinders made with a dry mix.

Two professors of civil engineering from Iowa State College, W. J. Schlick and M. G. Spangler, presented a paper, *Loads and Supporting Strengths of Rigid Pipe Conduits,* at the morning session on Saturday, March 12. Professor Schlick confined his comments to *Basic Theories and Relationships,* illustrating his talk with appropriate slides and charts.

Professor Spangler's paper was entitled *Present Knowledge of Certain Factors Required in Design.* The Marston theory of loads and supporting strengths of underground conduits, stated the speaker, is based upon sound principles of mechancis; and it is a reliable engineering tool for estimating the safe height of fill over a proposed underground conduit when reasonably accurate values of the physical factors upon which load and height of fill depend can be determined. At the present time, however, our knowledge of some of these factors and of methods of determining them in advance of the construction of a conduit is limited to such an extent that the results of the application of the theory appear to conflict with actuality. The purpose of this paper was to enumerate the various physical factors which influence the load and height of fill over an underground conduit and to point out the extent of the influence of each factor. The range of probable values and the deviation of assumed design values from those which may



• Members of the new board of directors of A.C.P.A. Seated, left to right: H. S. Price Jr., E. L. Johnson, E. H. Eby, H. P. Ford, J. A. Dunn, H. F. Peckworth, G. B. Denham, E. H. Fox, I. H. Smith and D. A. Dunkle. Standing: C. H. Bullen, G. F. Lillie, P. R. Hirsh and H. A. Weigand.

actually develop in the finished structure were also discussed.

The speaker gave an example wherein it was shown that the height of fill to produce a .01-in. crack in a 48-in. A.S.T.M. extra-strength reinforced concrete pipe installed as a projecting conduit on ordinary beddings may vary over a range of approximately 300 percent for various combinations of reasonably probable values of the influential physical factors. In the case of negative projecting conduits and imperfect ditch conduits, Professor Spangler pointed out, the range of heights of fill may be considerably greater than this.

The paper also contained a discussion of the meaning of the term "safe height of fill" and presented the author's viewpoint concerning certain considerations which are important in choosing an appropriate factor of safety in the design of a rigid pipe conduit.

E. F. Kelley had some interesting comments to make on *Some Unsolved Problems Related to Concrete Pipe*. According to him, one of the most pressing problems that has to be met and solved is the fixing of strength requirements for pipe having a diameter in excess of 72 in. Where these larger sizes of pipe are used the engineer should know what strength he may expect. Adequate strength in the larger sizes is even more important than in the smaller sizes because failures are more costly.

Mr. Kelley asserted that the Marston theory, by which it is possible to compute the dead load supported by a buried pipe, is practical provided that the variables that go into the equation are known. The trick is determining the value of these variables, which at the present time can only be computed by comprehensive and costly research.

• Lt. Gen. Robert Eichelberger, U. S. Army, retired, who addressed A.C.P.A. members during one of the sessions.

In view of the present practice, which permits the use of either the sand-bearing or three-edge bearing tests, it is possible for pipe of the same quality to fail in one type of strength test and to pass the requirements of the other. This creates distrust and confusion, said Mr. Kelley. Since the sand-bearing test is costly and time-consuming, he recommended that this test be discarded and that only one test be used in specifying the strengths of concrete pipe. There is ample precedent for this procedure, since the same thing was done in the A.S.T.M. specifications for cast-iron culvert pipe, clay pipe, and non-reinforced concrete sewer pipe.

Dr. Lorenz G. Straub presented a highly technical paper on *The Flow of Water in Culverts*. For purposes of discussion Dr. Straub divided culverts into two categories: (1) culverts flowing full, and (2) culverts flowing partly full. Dr. Straub's discussion was accompanied by colored movies which illustrated the points made in his talk.

Carl F. Izzard, highway research engineer, gave an informative discussion on trends in estimating rates of water runoff. By the use of charts, Mr. Izzard pointed out how it was possible to estimate the quantity of water which a specified culvert pipe will handle and the rate at which it will run off the road into the pipe.

Two New Concrete Plants Announced by Missourians

Two new concrete concerns have begun operations in Missouri towns. At Flat River, Concrete Products, Inc., will go into production in the near future in its new plant. Plans call for the manufacture of concrete pipe, as well as ready-mix. Proprietors of the new business are C. E. Trogdon and Aaron E. Vineyard.

Poplar Bluff is the location selected by J. E. Snipes, manager and owner, for his plant. All types of concrete block will be produced, states Mr. Snipes. The business will be conducted under the firm name of the Popular Bluff Block Company.

• M. G. Spangler, research professor of civil engineering, Iowa State College.

• Dr. Lorenz G. Straub, director, St. Anthony's Falls Hydraulic Laboratory.

• W. J. Schlick, research professor of civil engineering, Iowa State College.

General Shale Products Producing Glazed Blocks

GENERAL Shale Products Corp. of Johnson City, Tenn., has announced the production of Spectra-Glaze products at its Kingsport plant. Using the low-temperature glazing process developed by The Burns & Russell Co. of Baltimore, General Shale will glaze their regular cinder block in a new factory building especially designed and erected for the purpose.

Measuring 103 by 15 ft., the new building houses a straight-line glazing operation capable of producing up to sixty-three-hundred 4- by 8- by 16-in. glazed units in an 8-hour shift. The fully automatic equipment, furnished by the Schweitzer Equipment Co. of Cleveland, provides a glazing procedure that is as simple as it is efficient. Pre-selected and graded units of all standard sizes and shapes are placed on one end of the production line and emerge approximately 50 minutes later, ready for packaging and shipment.

General Shale is currently producing the very highest type cinder block, using two Besser machines. Strict quality control is maintained by daily laboratory tests on production units. In addition to the daily tests for strength, complete monthly tests are run for strength, absorption, combustibility, volume change, etc. A constant supply of cinders from one source virtually eliminates any marked deviations of physical and structural properties.

The Spectra-Glaze operation begins by bringing block from the curing chambers to the on-loading end of the glazing plant by a fork lift-truck, where the blocks are graded and placed upon a continuous belt. Moving slowly down the production line, the units are brushed, blown free of dust, and pre-heated to receive the glazing compound. The Burns & Russell glazing compounds are applied by a continuous spraying operation, after which the blocks move into the heating tunnel. The glazed-finished products emerge from the tunnel and are packaged in open cartons and cubed on pallets for storage.

According to George Sells, superintendent of the Kingsport plant, one of the greatest advantages of this low-temperature glazing operation is the almost complete absence of grade B material. This is due to careful grading of the units before glazing and to the fact that the fully automatic equipment practically eliminates any chance of off-grade units.

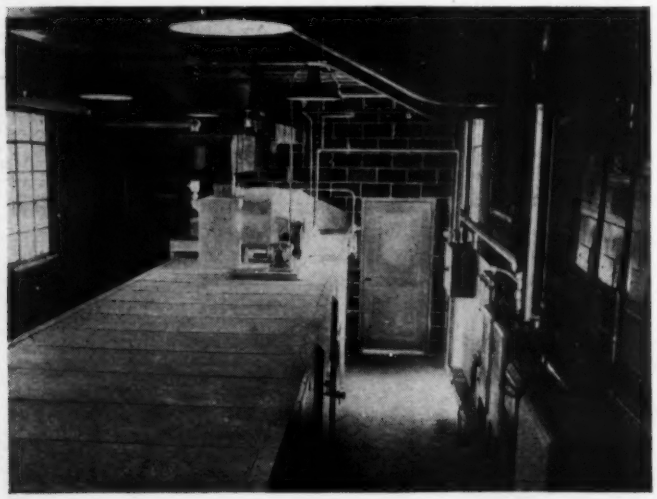
Another great advantage is the flexibility and ease in changing colors. A system has been worked out enabling a change from one color to another in about 10 minutes. It is therefore possible to glaze material "to order".

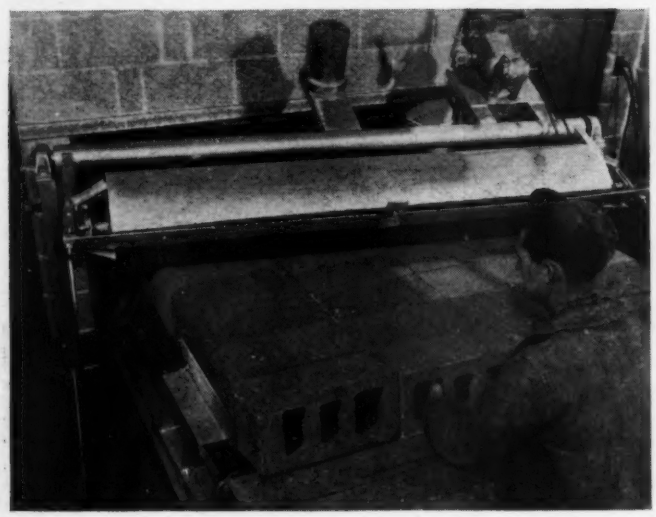
General Shale is in the enviable position of being able to merchandise color as well as the product itself. Taking advantage of the nation-wide desire for color, the firm is currently offering nine pleasing shades, five of which are similar to those developed by Colonial Williamsburg. The choice of standard colors was not made at random, but only after extensive consultations with architects, decorators, and builders throughout their trading area. Actually, *any* color can be furnished on special order.

General Shale is promoting the sale of Spectra-Glaze units with its usual aggressive merchandising activities, including three radio programs a week, weekly newspaper advertising, and direct mail. Public acceptance of the product is now coming on with a rush. Current jobs include such buildings as a church, a library building, a public school, a gasoline filling station, and a tourist court. Enthusiastic consumer reaction was experienced at two building material shows, one at Kingsport and another at Knoxville.

Regarding the quality of the glazed units, the results of an independent testing laboratory has proven conclusively that the glaze exceeds the claims made for it by the manufacturer.

Alexander H. Russell, president of The Burns & Russell Co., stated, "The glazing operation at the General Shale plant at Kingsport marks the beginning of a new industry. A low-cost, permanent, colorful glaze on regular molded masonry units will vastly broaden the market for the manufacturers of concrete products."





• Left: The heating tunnel at Kingsport, through which the blocks move after application of the glazing compound, to emerge as finished products.

• Below, left: The "loading on" operation in which blocks are brushed, blown free of dust, and preheated in preparation for glazing.

• Below, right: The "loading off" operation, showing finished blocks being removed from the tunnel for packaging in open cartons and eventual cubing for storage.

Multiple-Fork Truck Permits One Man to Load 1300 Units in 10 Minutes

To adapt lift-truck handling specifically to the needs and nature of the concrete block and cinder block industries, the Philadelphia Division of The Yale & Towne Mfg. Co. has developed a multiple-fork apron characterized by free vertical "floating" of the individual forks, and has worked out a handling system using the attachment which is so efficient that a single truck operator, without the use of skids, platforms, special clamps or assistants, can load approximately 1300 blocks (6 unit loads) within the remarkably short time of 10 minutes.

The economies over the use of clamp-type truck attachments result principally from elimination of maintenance cost and clamp-adjusting difficulties. Also, the forks are so simple in construction that their replacement after long periods of abrasive wear is a minor item.

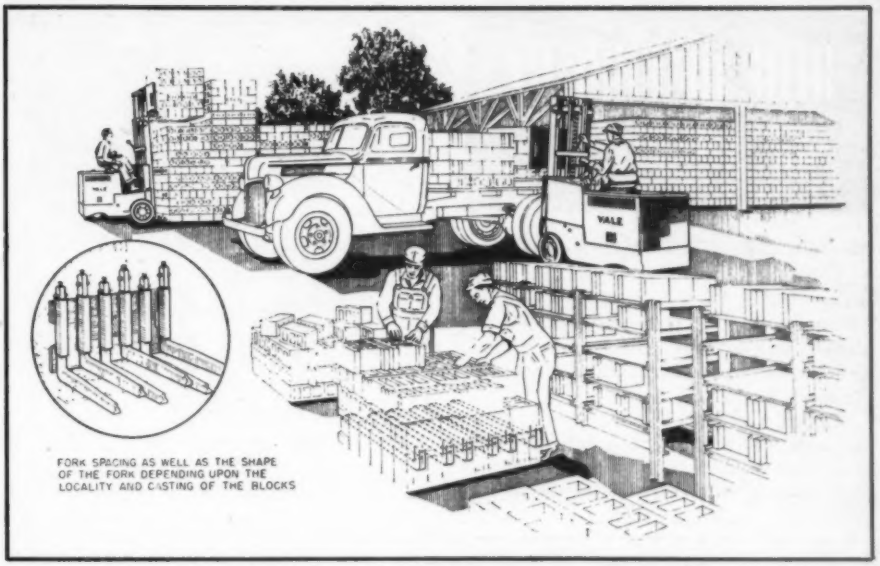
Since the variety of shapes of concrete and cinder blocks is increasing rather than decreasing (thanks to the diversity of modern building construction techniques and the necessity of cutting down on the labor required for masonry work), a fork system which can be simply adapted to many spacings and shapes of block is highly desirable. The inset in the drawing shows how adaptable the new Yale system is.

In the recommended system illustrated, the unit loads of block are built only once—manually—from the racks which come out of the drying ovens. No skids or platforms are used. Two men are shown at this work in the foreground of the drawing.

The unit loads thus built are thereafter handled entirely by lift truck. In the left background of the illustration a recommended three-tier stacking for open-air curing is illustrated.

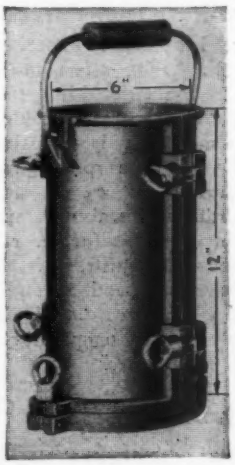
The delivery truck loading operating, illustrated in the center of the drawing, is the step for which time studies have shown an average speed of 130 blocks per minute.

The independent floating feature of the multiple-forks on trucks recommended for this type of manipulation allows the truck operator somewhat more leeway in spotting the truck by allowing for considerable misalignment during the insertion of the forks into the bottom layer of blocks. Another effect of the sliding forks is to eliminate block breakage by allowing automatic fork accommodation to non-uniformities of blocks, and the even distribution of support pressure.



• The inset shows the construction of the multiple-force apron with its free vertical "floating" of individual forks, designed to facilitate handling of concrete block and cinder block.

MOLINE CONCRETE TEST CYLINDER MOLD

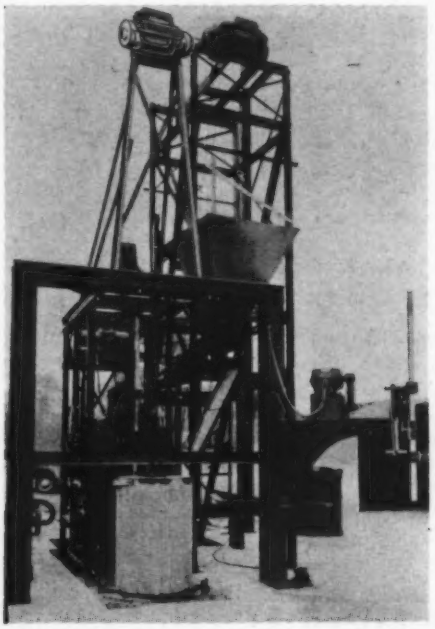


For concrete samples of exact measurement. Made of refined malleable iron, accurately machined, with bronze wing nuts and swing bolts.

MOLINE IRON WORKS
MOLINE, ILLINOIS, U.S.A.
Over Seventy Years of Service

CONTINENTAL MODEL T.I.C. 60

for ECONOMICAL PRODUCTION



High Efficiency
CONCRETE PIPE MACHINE
featuring

- Quality product meeting A.S.T.M. specifications
- Rugged construction
- Power driven tampers
- Easy take-off of pipe
- Makes pipe sizes 6" through 60"

There's a profitable market in your locality for high quality concrete pipe moulded in a CONTINENTAL 60 Pipe Machine.

This is a high-output unit, finely engineered and durably built for continuous, low-cost operation.

CONTINENTAL provides a complete line of accessories and cast equipment for making concrete pipe.

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NEW MACHINERY and SUPPLIES

● Stirrups for Precast Joists

The Automatic Spring Coiling Company, 4055 West Thorndale Avenue, Chicago 30, Ill., presents its newly-designed centered stirrups for precast joists, developed to provide maximum fire protection for the top bar.

Figure A shows the old type of stirrup in cross section. The top bar is larger than that used in the T-beam joists, and the offset produced by the old type stirrup brought the top bar too close to the surface of the joints to have sufficient coverage for fire protection. Using the old type stirrup and keeping the top bar on the center line of the joist would bring the vertical portion of the stirrup too close to the joist surface. Also the projecting portion would not be on the center line of the joists, making the placing of precast floor slabs difficult. Moreover, the engineer would not know the location of the top bar in respect to the center line of the joist.

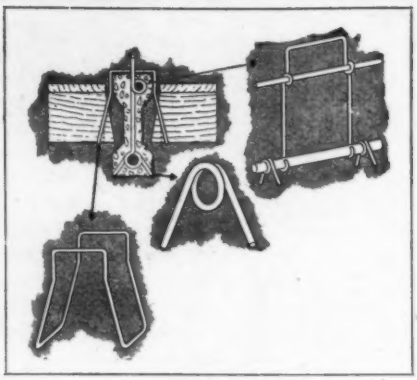


Figure A

As seen in Figure B the new type of stirrup centers the top bar for both the T-beam and the independent beam, thus providing the greatest possible fire protection for the steel.

The reverse kink below the top bar keeps the vertical portion of the stirrup on the center line of the joist and also furnishes this portion with maximum fire coverage. The top projecting portion of the stirrup has also been bent to keep it on approximately the center line of the joist, enabling the engineer to check rapidly on the accuracy with which the top bar was placed in reference to the center line of the joist. Bending this portion in this manner also insures non-interference with placing of precast floor slabs.

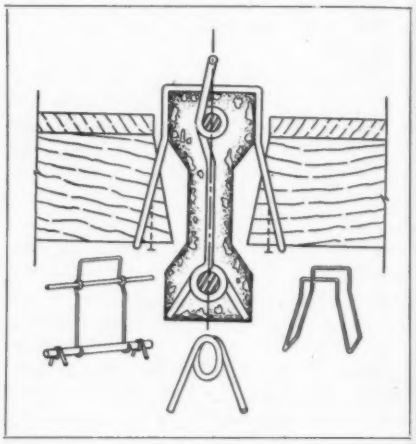


Figure B

● Rust-Resistant Paint

Speco, Inc., 3142 Superior Avenue, Cleveland 14, O., offers to the manufacturing industries its rust-resisting product, "Rustrem," available in black or aluminum. It is a paint applied with a brush or a spray gun over the rusted surface of metals, and is said to penetrate and seal such surfaces, insuring them against further rusting.

One coat of Rustrem is claimed to be sufficient protection, and will dry and set within two hours. This paint reportedly resists temperature changes, moisture and fumes.

● Correction

We wish to correct a misapprehension arising out of a descriptive item published in the January issue of THE CONCRETE MANUFACTURER on page 222. The products described were Hydrozo Water-Repellent Coatings, which were erroneously referred to as "waterproofing compounds." The description should have read, "Hydrozo Clear—a water-repellent coating which is both acid- and alkali-resistant."

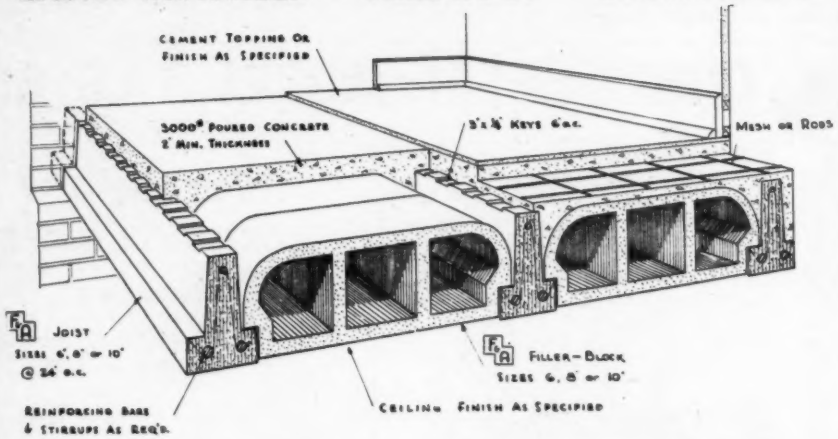
F&A *precast concrete*

ROOF and FLOOR SYSTEM

TRADE MARK

PATENT PENDING

EASILY INSTALLED • FIREPROOF • ECONOMICAL


CEMENT TOPPING OR FINISH AS SPECIFIED
3000# POURED CONCRETE 2" MIN. THICKNESS
3"x 1½" KEYS 6'oc.
MESH OR RODS
F&A JOIST SIZES 6', 8' or 10' @ 24" o.c.
F&A FILLER-BLOCK SIZES 6, 8 or 10"
REINFORCING BARS & STIRRUPS AS REQ'D.
CEILING FINISH AS SPECIFIED

The F&A Roof and Floor System is a combination of precast concrete joists and filler blocks, and a poured in place concrete top slab.

This modern method permits carrying any load for any span. It furnishes good sound and thermal insulation, and provides a flat ceiling suitable for plaster or paint.

Designed for quick installation by semi-skilled labor, the F&A System finds a profitable market in any locality.

MANUFACTURED BY

Formigli Brothers, Inc.
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Arnold Stone Company
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Knoxville, Tenn.

F. and A. ROOF and FLOOR SYSTEM EQUIPMENT

Distributed exclusively by

ROY DARDEN INDUSTRIES, INC.

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PROTECTED TERRITORIES AVAILABLE

● Roof and Floor System

Roy Darden Industries, Inc., P. O. Box 95, Northside Branch, Atlanta, Ga., has become exclusive distributor for F. & A. Roof and Floor System equipment. Developed jointly by Arnold Stone Co., Greensboro, N. C., Formigli Brothers, Inc., Philadelphia, Pa., and Southern Cast Stone Co., Knoxville, Tenn., the F. & A. System is a combination of precast concrete joists and filler blocks, and a poured-in-place concrete top slab. As shown in the accompanying cut, hollow blocks, which can be made on any high-production plain-pallet block machine, serve as void producers to reduce the dead weight of the slab construction. The concrete topping is poured so that the upper portion of the joists are embedded in the slab, supplying the bond necessary to produce T-beam action in the joists.

F. & A. System equipment includes mold boxes, joist forms, cradles, vibrating tables and other fixtures required to produce both joists and filler blocks in depths of 6, 8 and 10 in. Also included is complete engineering service for setting up the equipment and getting into production.

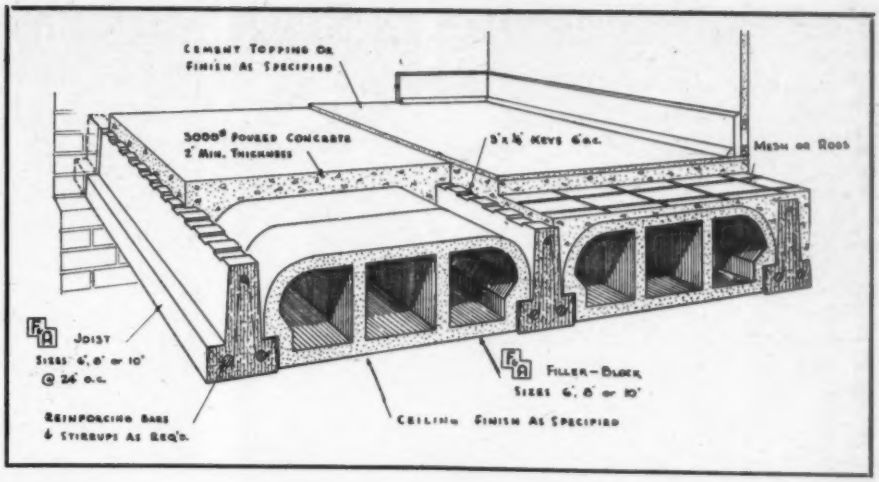
Floors and roofs constructed under the F. & A. System are said to withstand the standard 4-hr. fire and water test, and to furnish excellent sound and thermal insulation. When left exposed or pointed the blocks offer the appearance of a finished ceiling. They also provide a flat surface to which paint, plaster or other finishing materials may be applied directly. Excellent economy is also claimed for the system because it makes possible the speedy erection of floors and roofs by semi-skilled labor.

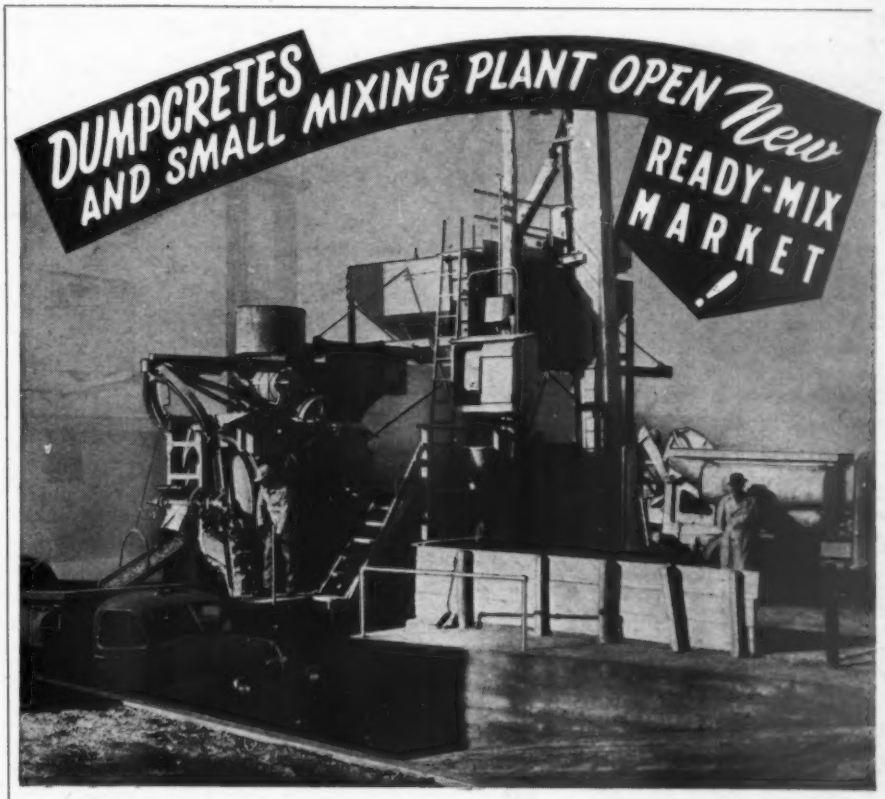
● All-Purpose Pipe Machine

The "Continental 60" (concrete pipe machine No. T.I.C.), a product of the Continental Concrete Pipe and Equipment Co., Inc., 1039 W. Goodale Blvd., Columbus, O., is equipped to make pipe from 6 to 60 in. in diameter in any wall thickness. Cited as desirable features by the manufacturer are rugged construction, power-driven tampers, low-operating cost, ease of operation and easy take-off. The machine produces A.S.T.M. specification pipe and reportedly permits an attractive profit.

The 1-ton electric skip hoist is installed parallel to the pipe machine, but where necessary it can be mounted diagonally without additional cost. Continental also supplies a 30-cu. ft. mixer with replaceable liner bars.

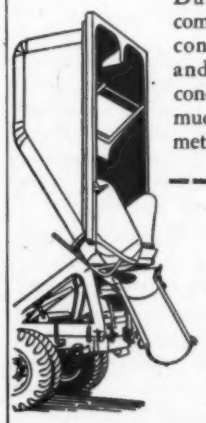
Pipe is made in bell end or tongue-and-groove, plain or reinforced. The prime mover is a 20-hp. motor operated by push-button control. The motor base is adjustable for tightening of V-belts. Upper and lower frame construction is of structural steel, electrically welded. The core guide is equipped with a slide at each end and is designed to guide the core into the exact postion to eliminate twisting and binding. A ¼-ton electric core hoist is installed at the top of the upper frame. The feeder box is complete with 3-hp. gear-headed motor and material hopper.


CEMENT TOPPING OR FINISH AS SPECIFIED
3000# POURED CONCRETE 1" MIN. THICKNESS
3"x 1½" KEYS 6' o.c.
MESH on ROOF
F&A JOIST SIZES 6", 8" or 10" @ 24" o.c.
F&A FILLER-BLOCK SIZES 6", 8" or 10"
REINFORCING BARS & STIRRUPS AS REQ'D.
CEILING FINISH AS SPECIFIED



A total investment of only $18,000 opened up a brand-new ready-mix market of farmers and local contractors in Winterset, Iowa (pop. 4000).

Concrete Products Co. bought a paver, a bin batcher, a bucket elevator and two Dumpcretes. With this complete operation they can control mixes accurately and deliver air-entrained concrete that is *superior* to much mixed today by other methods.



Their low-cost, non-agitating Dumpcretes mount on light trucks, load fast and discharge fast or slow—through a long, 13-foot chute. Neither segregation nor bleeding is a problem. Mont C. Johnson of Concrete Products Co. says, "Fifteen and 20 mile hauls are commonplace . . . We have had excellent acceptance of our product."

You are sure to want the details of this efficient ready-mix operation that delivers 50 to 100 yards a day. Mail the coupon today. There's absolutely no obligation.

The lower cost Dumpcrete is lightweight, watertight, with 13-foot chute, controlled higher discharge and lower center of gravity. Hauls sand, gravel, and coal too.

Send me facts about low-cost ready-mix plants and the Dumpcrete.

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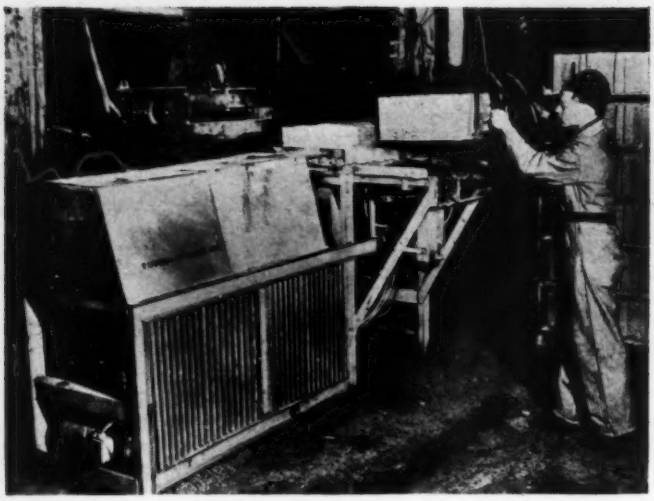
DUMPCRETE

DIVISION, MAXON CONSTRUCTION CO., INC.

534 Talbott Bldg., Dayton 2, Ohio



Left, Fig. 1: Loaded pallet being placed on master unit.
Right, Fig. 2: The cubing mechanism in action.

● Robot Handling System

Manufactured by the Kent Machine Co., Cuyahoga Falls, Ohio, the "Block-matic" robot handling system is a new custom-engineered, time- and labor-saving method for the rapid transfer of cured blocks to storage and the cleaning and returning of pallets to the feed magazine of the block machine. Each system is comprised of a varying number of component machines, depending upon the installation.

The basic machines in the system, however, are two air-operated hoists or offbearers, one or more roller conveyors, the master handling unit and one or more secondary handling units when changes in block travel direction are required.

The master handling unit is a composite of a motorized, synchronized block push-off arm with pallet cleaner, a chain-driven block machine magazine charger (which returns the cleaned empty pallets to the magazine of the block machine) and some of the manual and automatic control switches of the system.

Secondary handling units are comprised of a single motorized, synchronized push-off arm and a transfer table across which this arm moves when causing a change of direction in block travel and returns to await another cycle. A cycle description of the Kent handling system follows:

1. Operator with air-operated offbearer takes a loaded pallet from the rack and places it in a position on the master unit (see Fig. I).

2. Pallet contact with switch starts the cycle and sets chain drive into operation to move loaded pallet into position in line with the block push-off arm, which follows into action and pushes the blocks from the pallet onto conveyor, leaving the pallet in position.

3. Return stroke of the push-off arm performs the pallet cleaning with a scraper bar affixed to the underside of the arm.

4. At the completion of the return stroke of the push-off arm, the chain drive resumes operation and special lugs on the chains push the empty, stripped pallet to the block machine magazine. The operator then places a second loaded pallet in position on the master unit.

5. While the pallet magazine of the block machine is being charged with the stripped pallet, by chain drive movement, this same chain movement brings the second loaded pallet into position for block removal to the conveyor by the push-off arm.

6. As the cured block in groups of three are successively pushed from pallet to roller conveyor by the push-off arm, the blocks move down the conveyor to the secondary handling unit. Here the blocks move onto the transfer table and await the forward stroke of the secondary unit push-off arm, which begins when the master unit push-off arm starts its withdrawal stroke after pushing blocks from the pallet. The cured blocks then continue their travel down the second conveyor (situated in the block cubing room), at right angles to the first conveyor.

7. Cubing of blocks is done manually with another patented offbearer consisting essentially of a steel blade and an angle iron with one short side. This air-operated lifting unit closes over and

DRY WALLS

Interior or Exterior
Above or Below Grade

Eliminate costly guess work in solving wet wall problems. Seal and beautify porous walls of concrete block, tile, stucco, etc., with Spray-O-Bond Concrete Sealer. It's easy to apply — almost like brushing on paint. Used successfully by contractors for over 20 years. A post card will bring you the name of your nearest dealer.

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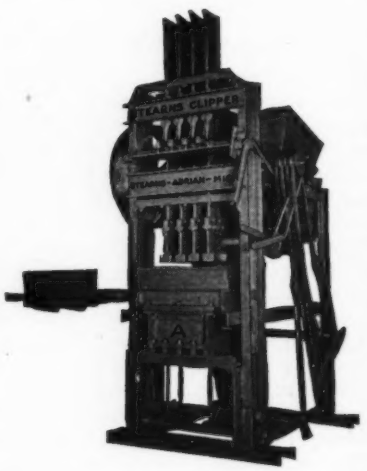


The Clipper Stripper, shown above, available in 5 models, is only one of the popular machines in the ANCHOR Line of Complete Equipment for the Concrete Products Plant. ANCHOR Engineering Service in the design of new plants or revamping older operations is nationally famous. Consult us before you buy equipment or modernize your plant . . . it costs no more.

Stearns Clipper Stripper Machines; Stearns Jolterete Machines; Stearns Mixers; Cast Iron and Press' Steel Pallets. Straublox Oscillating Attachments, etc. Repair parts for: Anchor, Stearns, Blystone Mixers and many others.

ANCHOR CONCRETE MACHINERY CO.
G. M. Friel, Manager Columbus, Ohio

firmly grabs fifteen 8-in. blocks at a time The cubing mechanism is attached to the lower end of an air hoist which travels on a small monorail (See Fig. II). It is claimed that one operator can unload a rack of 72 blocks and load them on a skid in about 3½ minutes.

The full skid loads of blocks are then easily transported to the yard for storage by a lift truck.

● Low-Cost Block Machine and Cavity Wall Blocks

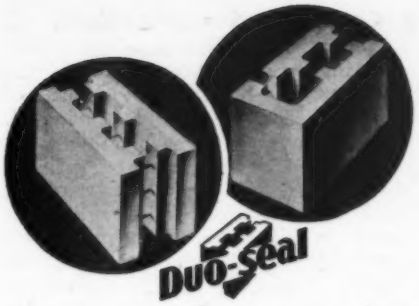
Designed to meet the demand for low-cost, power-operated equipment for concrete masonry units, the Sutter Model 29 block machine features, a new quick-change core box and co-axial strut. This machine is made by the H. R. Sutter Co., 661 Wyoming Ave., Buffalo 15, N. Y.

Scientifically determined vibration of the core box and aggregate is achieved by

rotating eccentrics, producing an even distribution of materials and blocks of uniform density and dimension. The vibrating mechanism is mounted in factory-sealed, ball-bearing journals and driven by an electric motor through a V-belt power transmission. Finger-tip controls provide instant operation and are designed to safeguard the operator and the machine. The height of the block may be varied at will by means of spacers which can be quickly inserted.

An exclusive feature of this machine, the co-axial hydraulic strut, delivers 7000 lbs. pressure in compaction and controls the height of the block without variation. The inner strut, delivering 1000 lbs. pressure, strips the block from the core box and holds it in position until removed by the off-bearer. A self-contained hydraulic power-pack provides power to perform all operations. Designed with safety relief valves, it insures safe operation of hydraulic pressures at 1000 p.s.i.

All operators of Sutter Model 49 block machines become licensees of the company. In Buffalo, N.Y., the local licensee is the Buffalo Septic Tank Co.



This firm manufacturers "Duo-Seal" cavity well building block, a unit which reportedly produces a wall free from moisture-conducting connections between inner and outer walls. The manufacturers state that with Duo-Seal construction plaster may be applied directly to the block without furring and plaster lath. Duo-Seal walls are described as "separated by a blanket of air that reduces the transfer of heat either direction".

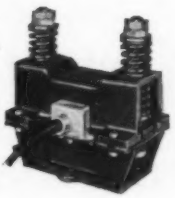
Two steel-reinforced vertical sections are cast in one operation to assure uniform alignment between the inner and outer wall surfaces. The units are produced in standard sizes, including full blocks, half blocks and corner blocks. They are available in a choice of colors.

Cavity wall construction is widely recognized as a means of controlling moisture penetration and heat loss.

BETTER CONCRETE PRODUCTS WITH SYNTRON

"Pulsating Magnet"

ELECTRIC VIBRATORS



Powerful, pulsating electro-magnets — that vibrate 3600 times per minute from 110 to 220 or 440 volt, 60 cycle A.C.

No cams, gears, eccentrics, motors, etc.

ON BLOCK MACHINES

Their powerful vibrations will produce a denser, stronger block, and improve its appearance.

Applied to either the mold box or the pallet, depending upon the design of the machine.

For hand or power machines.

ON PRECAST FORMS

Improve the quality and appearance of all types of pre-cast concrete products — sewer pipe, lintels, joists, standards, burial vaults, etc.

Speed up placing and setting and eliminate hand rodding and pounding.

Write for illustrated literature

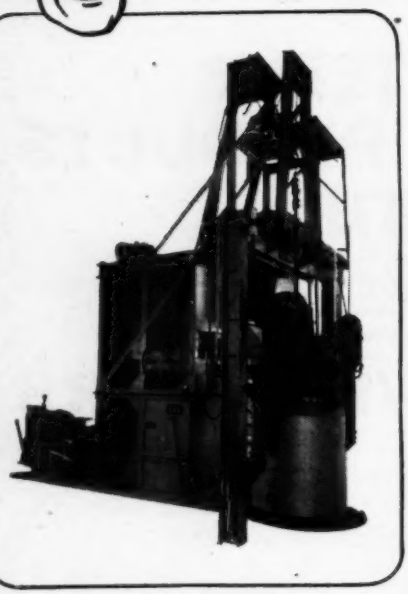
SYNTRON CO. 385 Carson, Homer City, Pa.

Get the complete story on how you can buy or lease

UNIVERSAL

pipe-making

MACHINES



For nearly three decades we've been making concrete pipe on our own machines. That's how we've learned to build them for highest production with fewest man-hours . . . Universal machines feature phenomenal tamping action—680 strokes per minute — thus use a drier mix with resultant stronger pipe that handles easily from machine to curing room.

Universal supplies all accessory equipment, too: Mixers, Bending Rolls for plate or wire mesh, Wire Mesh Welders. Write for details.

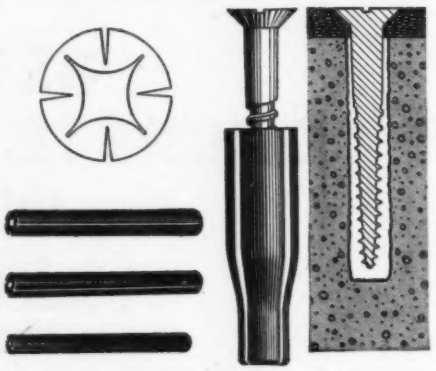
If you plan to expand present pipe production facilities, write us for information about the *Universal Lease Plan.*

UNIVERSAL CONCRETE MACHINERY CO.
297 South High Street Columbus, Ohio

● Expanding Screw Anchors

Sand Scott (patents pending) plastic expanding screw anchors for use in materials such as concrete are products of the Holub Industries, Inc., Sycamore, Ill. These anchors are made of ethyl cellulose, a material selected for its ability to withstand age, moisture, corrosion, shock and vibration and for its high rating in di-electric and mechanical characteristics. Pull-out tests conducted by the Pittsburgh Testing Laboratory show holding power up to 2,965 lbs. (maximum pull) for the largest size, with 2,194 lbs. the average of four tests.

The anchors, which can be cut to any length required, are made in seven diameters, ranging from No. 6 for 5 and 6 screws to No. 20 for 20 screws. No special tools are required for installation, which is said to be simple and fool-proof. They may be used outdoors. The overlapping internal center slits give the "concertina" expansion indispensable in screw anchors.



All sizes of anchors are available in standard cartons and in assortment kits in three combinations. The kits are of transparent plastic.

Holub also manufactures carbide-tipped masonry drills for drilling holes to accommodate the anchors. These are made in 18 diameter sizes, from 11/64 in. to 1½ in.

● Finish for Concrete Surface

Irvington Farm & Tank Corp., Irvington, N. Y., has developed a new speed finish for exterior and interior concrete walls, newly-poured or old, which is said to give a very smooth coat. The interior finish is a special powder that is merely mixed with water before application; the exterior bonding and finish coats are mixed with sand and water. The resulting compounds make a chemical as well as a mechanical bond with the concrete.

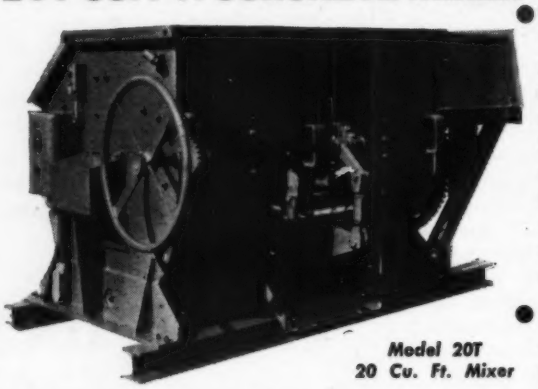
The speed finish was developed to meet objections to the impairment of the face of concrete walls which develops when a so-called rubbed finish is used. The rubbed finish disturbs the cement particles of the concrete prior to the time the surface becomes a case-hardened face.

Exterior speed finish is applied in two coats. The first, or bond coat, fills voids and smooths the wall. Since the

WITTEMANN MACHINERY COMPANY

(Successors to E. B. Kelley Co.)

20T CU. FT. CONCRETE MIXER



Model 20T
20 Cu. Ft. Mixer

● Our other standard products are 30 cu. ft. mixers—power stripper tamping machines, air-operated. 20 and 30 cu. ft. capacity skip-loaders — conveyors — conveyor belting and chains — bucket elevators — bins — crushers — vibrating screens lift trucks — compressors and electric motors.

● We also carry a full line of Anchor Tamper and Stripper parts.

● The Model 20T mixer, built with replaceable abrasive-resistant steel bar liners, is of the paddle-blade type, with a side-door discharge, mounted on steel skids.
The model is direct motor driven by a 10 h.p., 3-phase, 60 cycle, 220 volt motor. This motor is mounted near the top (of the mixer drum), making it more accessible.
The Model 20T mixer can also be furnished with either a clutch—pulley or gasoline engine drive, whichever is preferred.

● *Write for information on applications other than concrete.*

WITTEMANN MACHINERY CO.

A Complete Line of Equipment for the Concrete Block-Making Industry.

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second, or finish coat, may be applied after the roof is on, there is no more concrete to be poured and a uniform color can be obtained over the entire structure. Both these coats are applied with a cork float. The special finish for interior walls can be left natural or painted. No bond coat is needed; there is a plaster-smooth surface which is amply covered by one coat of cold water paint.

Speed finish was developed primarily for use with Atlas Speed Forms, which give a hard, dense concrete; but the finish can be applied to old concrete just as effectively as to newly-poured.

● Pneumatic Vibrators

The Cleveland Vibrator Company has announced the availability of Series "SA" pneumatically-operated vibrators which feature low air consumption, a small number of parts, instant starting with full power, and adaptability for a wide range of applications.

These vibrators are recommended for such applications as assuring steady flow

from hoppers, settling the mix in concrete products and block-making machines.

Seven sizes of Series "SA" vibrator are available with five different mounting arrangements, as shown in the accompanying illustration. These units range in overall dimensions from 5⅜ by ⅞ by ½ in. to 8 by ¾ by 2¼ in.

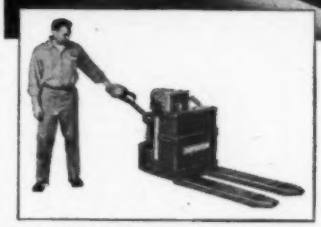
Air consumption of the various sizes ranges from 5 to 8½ ft. per minute on 80-p.s.i. line pressure. At this same line pressure, speeds of operation range from 5100 on the smallest size to 1950 vibrations per minute on the largest size. The square, chromed steel body is borized to a micro finish, and the heat-treated, ground, hard-chromed-plated piston and anvil-type heads are uniformly hardened to resist a tendency to mushroom.

Piston diameters of the seven sizes in the Series "SA" vibrators are ⅜, ½, ⅝, ¾, ⅞, 1 and 1¼ in. These vibrators are manufactured by Cleveland Vibrator Company, 2806 Clinton Avenue, Cleveland 13, Ohio.

● Correction

We regret that in an item describing a Barrett-Cravens spring frame lift truck appearing on page 188 of the March issue we erroneously identified the device as Model RKL-90. The designation of this lift truck should have been given as Model RKL-960.

IT'S A NEW TOWMOTOR ELECTRIC HAND-TRUCK



Control handle swings on 200° steering arc.

Forks slide easily under palletized load.

SPECIAL TOWMOTOR *Safety Feature!*

Immediately upon releasing the control handle of the Towmotor Model "W" Truck . . .
. . . the spring equipped, self return automatic turn-off switches cut the power supply to the motor.
. . . the heavy duty spring returns the handle to vertical position, instantly applying the positive, quick-acting brake to the drive shaft.
. . . INSURING IMMEDIATE CUT OFF OF POWER AND POSITIVE STOPPING OF THE TRUCK.

Here is the new Towmotor electric pallet hand-truck built to Towmotor's exacting engineering standards. Its compactness, maneuverability and well balanced design make it possible to operate the new Towmotor 25% faster than the average hand truck.* The steering handle is equipped with twin control buttons conveniently located for either right or left hand operation, which enable the operator to guide the truck from any angle. Other Towmotor Model "W" pallet hand-truck features include rapid hydraulic lift, easily detachable forks, positive traction power, 3-point suspension and differential-action trailer wheels. Write today for full information on this and other models in Towmotor's complete line of Fork Lift Trucks and Tractors.

*BY ACTUAL TEST WITH RATED LOAD.

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● Straddle Truck

Just announced by the Hyster Company, Portland, Ore., is an improved model "M" straddle truck of 18,000-lb. capacity. Replacing a 12,000-lb. truck, the new machine is not larger in size, but because of a revised main frame structure and a new hoist clutch arrangement it is capable of carrying a heavier load. Greater visibility from the driver's seat has been attained by use of a forward sloping hood.

One of the main features of the new model is a "spring suspension" system which insures better riding and steering, gives more traction for driving wheels, reduces frame stress and tire wear, and facilitates travel over slippery or rough road surfaces.

Operating on pneumatic tires and having four-wheel hydraulic brakes, the truck is powered by a 6-cylinder 82-hp. engine and has four speeds forward and back. It may be geared for maximum speeds of from 30 to 45 m.p.h. Without a load the straddle truck has an average turning radius on level ground of 12¼ ft. A positive-acting automatic stop prevents over-run of the worm-gear-driven roller-chain hoisting and lowering mechanism.

The standard model is equipped with mechanical swinging shoe control; however, vacuum and automatic controls are available as optional equipment.

● Concrete Pipe Bends

Offered by the Houston Concrete Pipe Co., 6600 Washington Ave., Houston, Tex., is the Dixon pipe bend machine, used for manufacturing concrete pipe bends. The device is a portable machine constructed of cast iron and having a roller-chain drive of rugged construction. In recent tests, one man has made 75 four-inch quarter bends (90°), 125 four-inch eighth bends (45°), 50 six-inch quarter bends and 90 six-inch eighth bends per day.

A BONUS EVERY PAYDAY *to* truck-man OWNERS!

● **MORE** man-hours saved . . . block plant operators say Truck-Man does the work of *two* or more men with push-pull trucks . . . pays for itself in labor saved!

● **MORE** blocks moved . . . the big 62" platform handles the largest racks easily . . . 360° turning radius permits maneuvering in small spaces . . . hydraulic lift and gasoline power assure easy, speedy handling.

● **MORE** blocks saved . . . Truck-Man's easy lift and drop, soft start and stop and cushion ride spot big racks gently, without checking of green blocks.

● **MORE** employee satisfaction . . . lets you transfer men to productive work; eliminates drudgery of "push and pull" . . . simple controls enable any worker to operate . . . and he rides with the load.

A profit bonus on payday . . . and every day!

Ask any operator, or get details from Truck-Man's block machinery specialists:

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FLORIDA
F. C. George Machine Co., Orlando
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IOWA
Olsen Sales Co., Rock Rapids

MASSACHUSETTS
Clark-Wilcox Co., Boston
Siano & Sons, Greenfield

MICHIGAN
Lith-I-Bar Co., Holland
R. S. Reed Corp., Three Rivers
Central Gocorp, Adrian

MISSOURI
Concrete Transport Mixer Co., St. Louis
Fleming Mfg. Co., St. Louis

NEW JERSEY
Witteman Machinery Co., Farmingdale

OHIO
Anchor Concrete Mach. Co. Columbus
Kent Machine Co., Cuyahoga Falls
Multiplex Conc. Machy. Co., Elmore

ONTARIO, CANADA
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